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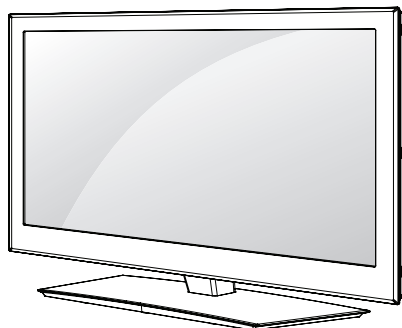Asia/Oceania   http://biz.lgservice.com

LED LCD TV
SERVICE MANUAL

CHASSIS : LD12D

MODEL: 55LW980S   55LW980S-ZA

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.

     Printed in Korea

CONTENTS

SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.

**Do not use a line Isolation Transformer during this check.**
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit

AC Volt-meter

To Instrument's exposed METALLIC PARTS

Good Earth Ground such as WATER PIPE, CONDUIT etc.

0.15 uF

1.5 Kohm/10W
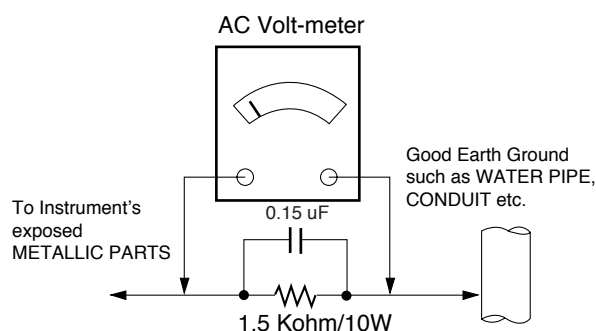
When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω
*Base on Adjustment standard

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This specification is applied to the LED LCD TV used LD12D chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

1) Temperature: 25 ºC ± 5 ºC(77 ºF ± 9 ºF), CST: 40 ºC ± 5 ºC
2) Relative Humidity : 65 % ± 10 %
3) Power Voltage
   : Standard input voltage (AC 100-240 V~, 50 / 60 Hz)
   * Standard Voltage of each products is marked by models.
4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

1) Performance: LGE TV test method followed
2) Demanded other specification
   - Safety : CE, IEC specification
   - EMC :CE, IEC

4. Model General Specification

No.	Item	Specification	Remarks
1	Market	EU(PAL Market-36Countries)	**DTV & Analog (Total 36 countries)** **DTV (MPEG2/4, DVB-T) :** 31 countries (England/Italy/Germany/France/Spain/Sweden/Finland/Netherlands/Belgium/Luxemburg/ Greece/Denmark/Czech/Austria/Hungary/Swiss/Croatia/Turkey/Norway/Slovenia/Poland/ Ukraine/Portugal/Ireland/Morocco/Latvia/Estonia/Lithuania/Rumania/Russia/Slovakia) **DTV (MPEG2/4, DVB-T2): 6 countries** (England/Denmark/Sweden/Finland/Norway/Ireland) **DTV (MPEG2/4, DVB-C): 14 countries** Slovenia/Poland/Hungary/Swiss/Austria/France/Sweden/Netherlands/Denmark/Germany/ Finland/Norway/Ukraine/Russia **DTV (MPEG2/4,DVB-S): 33 countries** Albania/Austria/Belgium/Bosnia/Bulgaria/Croatia/Czech/Estonia/France/Germany/Greece/ Hungary/Ireland/Italy/Kazakhstan/Latvia/Lithuania/Luxembourg/Morocco/Netherlands/Poland/ Portugal/Romania/Russia/Serbia/Slovenia/Spain/Slovakia/Switzerland/Turkey/Ukraine/ Norway/Benelux **Analog Only - 5 countries** (Bosnia/Serbia/Bulgaria/Albania/Kazakhstan) **Supported satellite : 22 satellites** HISPASAT 1C/1D, ATLANTIC BIRD 2, NILESAT 101/102, ATLANTIC BIRD 3, AMOS 2/3, THOR 5/6, IRIUS 4, EUTELSAT-W3A, EUROBIRD 9A, EUTELSAT-W2A, HOTBIRD 6/8/9, EUTELSAT-SESAT, ASTRA 1L/H/M/KR, ASTRA 3A/3B, BADR 4/6, ASTRA 2D, EUROBIRD 3, EUTELSAT-W7, HELLASSAT 2, EXPRESS AM1, TURKSAT 2A/3A, INTERSAT10
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L', DK, BG, I 5) DVB-T 6) DVB-C 7) DVB-T2 8) DVB-S	DVB-S :Satellite

No.	Item	Specification	Remarks

3	Receiving system	Analog : Upper Heterodyne
		Digital : COFDM , QAM
			▶ **DVB-T**
			- Guard Interval(Bitrate_Mbit/s)
			  1/4, 1/8, 1/16, 1/32
			- Modulation : Code Rate
			  QPSK : 1/2, 2/3, 3/4, 5/6, 7/8
			  16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8
			  64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8
			
			▶ **DVB-T2**
			- Guard Interval(Bitrate_Mbit/s)
			  1/4,1/8,1/16,1/32,1/128,19/128,19/256,
			- Modulation : Code Rate
			  QPSK : 1/2, 2/5, 2/3, 3/4, 5/6
			  16-QAM : 1/2, 2/5, 2/3, 3/4, 5/6
			  64-QAM : 1/2, 2/5, 2/3, 3/4, 5/6
			  256-QAM : 1/2, 2/5, 2/3, 3/4, 5/6
			
			▶ **DVB-C**
			- Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s
			- Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM
			
			▶ **DVB-S**
			- Symbolrate
			DVB-S2 (8PSK/ QPSK) : 2 ~ 45 Msymbol/s
			DVB-S (QPSK) : 2~ 45 Msymbol/s
			- viterbi
			DVB-S mode :1/2, 2/3, 3/4, 5/6, 7/8
			DVB-S2 mode : 1/2, 23, 3/4, 3/5, 4/5, 5/6, 8/9, 9/10

4	Scart Gender Jack(1EA)	PAL, SECAM	Scart Jack is Full scart and support MNT/DTV-OUT(not support DTV Auto AV)
5	Video Input RCA(2EA)	PAL, SECAM, NTSC	System : PAL, SECAM, NTSC, PAL60 Rear 1EA, AV gender jack 1EA
6	Head phone out	Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, HDMI4, USB	
7	Component Input(1EA)	Y/Cb/Cr, Y/Pb/Pr	Component Gender 1EA
8	RGB Input	RGB-PC	Analog(D-SUB 15PIN)
9	HDMI Input (4EA)	HDMI1-DTV/DVI HDMI2-DTV HDMI3-DTV HDMI4-DTV	PC(HDMI version 1.3) Support HDCP
10	Audio Input (4EA)	RGB/DVI Audio, Component, AV1, 2	L/R Input
11	SDPIF out (1EA)	SPDIF out	
12	USB (2EA)	EMF, DivX HD, For SVC(download)	JPEG, MP3, DivX HD

5. Component Video Input (Y, C_B/P_B, C_R/P_R)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	720x480	15.73	60.00	SDTV,DVD 480i	
2.	720x480	15.63	59.94	SDTV,DVD 480i	
3.	720x480	31.47	59.94	480p	
4.	720x480	31.50	60.00	480p	
5.	720x576	15.625	50.00	SDTV,DVD 625 Line	
6.	720x576	31.25	50.00	SDTV 576p	
7.	1280x720	45.00	50.00	HDTV 720p	
8.	1280x720	44.96	59.94	HDTV 720p	
9.	1280x720	45.00	60.00	HDTV 720p	
10.	1920x1080	31.25	50.00	HDTV 1080i	
11.	1920x1080	33.75	60.00	HDTV 1080i	
12.	1920x1080	33.72	59.94	HDTV 1080i	
13.	1920x1080	56.250	50	HDTV 1080p	
14.	1920x1080	67.5	60	HDTV 1080p	

6. RGB (PC)

No.	Specification				Proposed	Remarks
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel Clock(MHz)		
1.	720*400	31.468	70.08	28.321		For only DOS mode
2.	640*480	31.469	59.94	25.17	VESA	Input 848*480 60 Hz, 852*480 60 Hz -> 640*480 60 Hz Display
3.	800*600	37.879	60.31	40.00	VESA	
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	
5.	1360*768	47.72	59.8	84.75	WXGA	
6.	1920*1080	66.587	59.93	138.625	WUXGA	FHD model

7. HDMI Input
(1) DTV Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*480	31.469/31.5	59.94/60	27.00/27.03	SDTV 480P	
2.	720*576	31.25	50	54	SDTV 576P	
3.	1280*720	37.500	50	74.25	HDTV 720P	
4.	1280*720	44.96/45	59.94 /60	74.17/74.25	HDTV 720P	
5.	1920*1080	33.72/33.75	59.94 /60	74.17/74.25	HDTV 1080I	
6.	1920*1080	28.125	50.00	74.25	HDTV 1080I	
7.	1920*1080	26.97/27	23.97/24	74.17/74.25	HDTV 1080P	
8.	1920*1080	33.716/33.75	29.976 /30.00	74.25	HDTV 1080P	
9.	1920*1080	56.250	50	148.5	HDTV 1080P	
10.	1920*1080	67.43/67.5	59.94 /60	148.35/148.50	HDTV 1080P	

(2) PC Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*400	31.468	70.08	28.321		HDCP
2.	640*480	31.469	59.94	25.17	VESA	HDCP
3.	800*600	37.879	60.31	40.00	VESA	HDCP
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	HDCP
5.	1360*768	47.72	59.8	84.75	WXGA	HDCP
6.	1920*1080	67.5	60.0	138.625	WUXGA	HDCP/FHD model

8. 3D Mode

(1) HDMI Input

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	53.95/54	23.98/24	148.35/148.5	HDTV 1080P	HDMI 3D Frame packing
2	1280*720	89.9/90	59.94/60	148.35/148.5	HDTV 720P	HDMI 3D Frame packing
3	1280*720	75	50	148.5	HDTV 720P	HDMI 3D Frame packing
4	1920*1080	67.5	60	148.5	HDTV 1080P	Side by Side(half), Top and bottom Checkerboard, Single Frame Sequential
5	1920*1080	56.25	50	148.5	HDTV 1080P	Side by Side(half), Top and bottom Checkerboard, Single Frame Sequential
6	1280*720	45	60	74.25	HDTV 720P	Side by Side(half), Top and Bottom HDMI 3D Top and Bottom
7	1280*720	37.5	50	74.25	HDTV 720P	Side by Side(half), Top and Bottom HDMI 3D Top and Bottom
8	1920*1080	33.75	60	74.25	HDTV 1080i	Side by Side(half), Top and Bottom HDMI 3D Top and Bottom
9	1920*1080	28.125	50	74.25	HDTV 1080i	Side by Side(half), Top and Bottom HDMI 3D Top and Bottom
10	1920*1080	27	24	74.25	HDTV 1080P	Side by Side(half), Top and Bottom, Checkerboard, HDMI 3D Top and Bottom
11	1920*1080	33.75	30	89.1	HDTV 1080P	Side by Side(half), Top and Bottom, Checkerboard
12	1920*1080	67.5	30	74.25	HDTV 1080P	HDMI 3D Frame packing

(3) RF 3D Input(DTV)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	37.500	50	74.25	HDTV 720P	Side by Side, Top & Bottom
2	1920*1080	28.125	50	74.25	HDTV 1080I	Side by Side, Top & Bottom

(4) DLNA

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	33.75	30	74.25	HDTV 1080P	Side by Side, Top & Bottom, Checkerboard

(5) USB Input

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30.000	74.25	Side by Side Top & Bottom Checkerboard MPO(photo)	HDTV 1080P

(6) RGB Input

| No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	66.587	59.934	74.25	HDTV 1080P	Side by Side, Top & Bottom

(7) 3D Input mode

No.	Side by Side	Top & Bottom	Checkerboard	Single Frame Sequential	Frame Packing	2D to 3D
1.						

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LED LCD TV with LD12D chassis.

2. Designation

(1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
(2) Adjustment must be done in the correct order.
(3) The adjustment must be performed in the circumstance of 25 °C ± 5 °C of temperature and 65 % ± 10 % of relative humidity if there is no specific designation.
(4) The input voltage of the receiver must keep AC 100-240 V~, 50 / 60Hz.
(5) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15.

In case of keeping module is in the circumstance of 0 °C, it should be placed in the circumstance of above 15 °C for 2 hours

In case of keeping module is in the circumstance of below -20 °C, it should be placed in the circumstance of above 15 °C for 3 hours.

[Caution]
When still image is displayed for a period of 20 minutes or longer (especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area.

3. Automatic Adjustment
3.1. ADC Adjustment

(1) Overview
ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.
* If Adjust ADC is "OTP", It doesn't need ADC adjustment. (GP3-BCM)

(2) Equipment & Condition
1) Jig (RS-232C protocol)
2) MSPG-925 Series Pattern Generator(MSPG-925FA, pattern - 65)
  - Resolution : 480i Comp1
            1080P Comp1
            1920*1080 RGB
  - Pattern : Horizontal 100% Color Bar Pattern
  - Pattern level : 0.7 ± 0.1 Vp-p
  - Image

(3) Adjustment
1) Adjustment method
  - Using RS-232, adjust items in the other shown in "3.1.(3).3)"

2) Adj. protocol

Protocol	Command	Set ACK
Enter adj. mode	aa 00 00	a 00 OK00x
Source change	xb 00 40	b 00 OK40x (Adjust 480i, 1080p Comp1)
	xb 00 60	b 00 OK60x (Adjust 1920*1080 RGB)
Begin adj.	ad 00 10	
Return adj. result		OKx (Case of Success)
		NGx (Case of Fail)
Read adj. data	(main)	(main)
	ad 00 20	00000000000000000000000000007c007b006dx
	(sub)	(Sub)
	ad 00 21	00000007000000000000000000007c00830077x
Confirm adj.	ad 00 99	NG 03 00x (Fail)
		NG 03 01x (Fail)
		NG 03 02x (Fail)
		OK 03 03x (Success)
End adj.	aa 00 90	a 00 OK90x

Ref.) ADC Adj. RS232C Protocol_Ver1.0

3) Adj. order
  - aa 00 00 [Enter ADC adj. mode]
  - xb 00 04 [Change input source to Component1(480i&1080p)]
  - ad 00 10 [Adjust 480i Comp1]
  - xb 00 06 [Change input source to RGB(1024*768)]
  - ad 00 10 [Adjust 1024*768 RGB]
  - ad 00 90 End adj.

3.2. MAC address/ CI+ key, Widevine key D/L

Connect: PCBA Jig-> RS-232C Port== PC-> RS-232C Port
Communication Port connection

RS-232C Port

■ Com 1,2,3,4 and 115200(Baud rate)
  Mode check : Online Only
■ Check the test process: DETECT -> MAC -> CI -> Widevine
■ Play : START
■ Result : Ready, Test, OK or NG
■ Printer Out(MAC Address Label)

3.3. LAN Inspection

(1) Equipment & Condition
  ■ Each other connection to LAN Port of IP Hub and Jig

IP : 192.168.123.254

LAN Hub
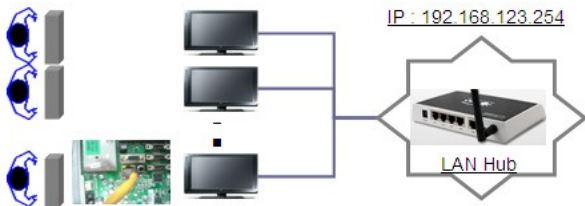
(2) LAN inspection solution
  ■ LAN Port connection with PCB
  ■ Network setting at MENU Mode of TV
  ■ setting automatic IP
  ■ Setting state confirmation
  -> If automatic setting is finished, you confirm IP and MAC Address.

PCBA JIG Ready   Setting automatic IP
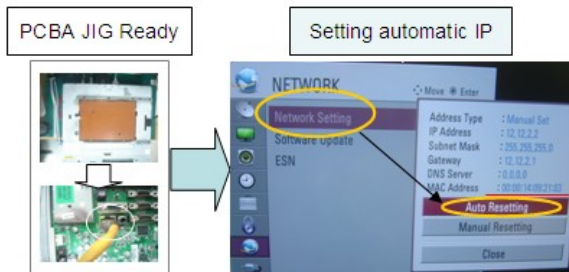
3.4. Widevine Key Inspection

Widevine key Inspection
- Confirm key input Data at the "IN START" MENU Mode.

3.5. LAN PORT INSPECTION(PING TEST)

Connect SET -> LAN port == PC -> LAN Port

SET ———— PC

(1) Equipment setting
  1) Play the LAN Port Test PROGRAM.
  2) Input IP set up for an inspection to Test Program.
      *IP Number : 12.12.2.2

(2) LAN PORT inspection (PING TEST)
  1) Play the LAN Port Test Program.
  2) Connect each other LAN Port Jack.
  3) Play Test (F9) button and confirm OK Message.
  4) Remove LAN cable.

3.6. Model name & Serial number Download

(1) Model name & Serial number D/L
  ■ Press "Power on" key of service remote control.
    (Baud rate : 115200 bps)
  ■ Connect RS232 Signal Cable to RS-232 Jack.
  ■ Write Serial number by use RS-232.
  ■ Must check the serial number at Instart menu.

(2) Method & notice
  A. Serial number D/L is using of scan equipment.
  B. Setting of scan equipment operated by Manufacturing Technology Group.
  C. Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

* Manual Download (Model Name and Serial Number)
  If the TV set is downloaded by OTA or service man, sometimes model name or serial number is initialized.(Not always)
  There is impossible to download by bar code scan, so It need Manual download.
  a. Press the 'instart' key of ADJ remote control.
  b. Go to the menu '5.Model Number D/L' like below photo.
  c. Input the Factory model name(ex 42LW950-ZA) or Serial number like photo.
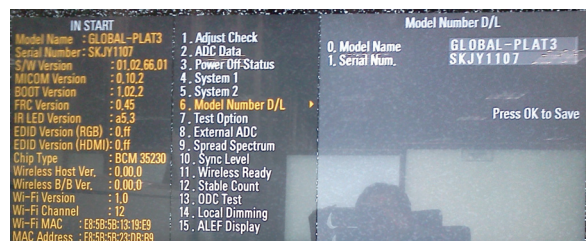
  d. Check the model name Instart menu. -> Factory name displayed. (ex 42LW750S-ZA)
  e. Check the Diagnostics. (DTV country only) -> Buyer model displayed. (ex 42LW750S-ZA)

3.7. CI+ Key checking method

Check whether the key was downloaded or not at 'In Start' menu. (Refer to below).

=> Check the Download to CI+ key value in LGset.

3.7.1. Check the method of CI+ Key value
(1) Check the method on Instart menu.
(2) Check the method of RS232C Command.
   1) Into the main assembly mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

   2) Check the key download for transmitted command. (RS232 : ci 00 10)

CMD 1	CMD 2	Data 0	
C	I	1	0

   3) Result value
   - Normally status for download : OKx
   - Abnormally status for download : NGx

3.7.2. Check the method of CI+ Key value (RS232)
   1) Into the main assembly mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

   2) Check the method of CI+ key by command (RS232 : ci 00 20)

CMD 1	CMD 2	Data 0	
C	I	2	0

   3) Result value
   i 01 OK 1d1852d21c1ed5dcx
   ⟶ CI+ key Value

3.8. WIFI MAC ADDRESS CHECK

(1) Using RS232

	H-freq(kHz)	V-freq.(Hz)
Transmission	[A][I][ ][Set ID][ ][20][Cr]	[O][K][X] or [NG]

(2) Check the menu on in-start.

4. Manual Adjustment

4.1. ADC Adjustment

ADC adjustment is not needed because of OTP.(Auto ADC adjustment)

4.2. EDID(The Extended Display Identification Data)/DDC(Display Data Channel) download

(1) Overview
It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

(2) Equipment
- Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.
- Adjust remote control

(3) Download method
   1) Press ADJ key on the Adjustment remote control, then select "12.EDID D/L", By pressing Enter key, enter EDID D/L menu.
   2) Select [Start] button by pressing Enter key, HDMI1/ HDMI2/ HDMI3/ HDMI4/ RGB are Writing and display OK or NG.

(4) EDID DATA
■ HDMI

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D						
0x01			01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	40	81	C0	81	0	81	80	95	0
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
0x06	3F	1F	52	10	00	0A	20	20	20	20	20	20				
0x07															01	1
0x00	02	03	37	F1	4E	10	1F	84	13	05	14	03	02	12	20	21
0x01	22	15	01	26	15	07	50	09	57	07						
0x02																
0x03				E3	05	03	01	01	1D	80	18	71	1C	16	20	58
0x04	2C	25	00	A0	5A	00	00	00	9E	01	1D	00	80	51	D0	1A
0x05	20	6E	88	55	00	A0	5A	00	00	00	1A	02	3A	80	18	71
0x06	38	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	00	00	00
0x07	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	2

■ RGB

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	0	FF	FF	FF	FF	FF	FF	0	1E	6D						
0x01			01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20				
0x07															0	3

■ Reference
- HDMI1 ~ HDMI4 / RGB
- In the data of EDID, bellows may be different by S/W or Input mode.

Product ID

Model Name	HEX	EDID Table	DDC Function
ALL	0001	0100	Analog
	0001	0100	Digital

Serial No. : Controlled on product line

Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
   Year : '2011' -> '15'

Model Name(Hex): LGTV

MODEL	MODEL NAME(HEX)
all	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

Checksum: Changeable by total EDID data.

INPUT	1	2	3
HDMI1	7F	CB	X
HDMI2	7F	BB	X
HDMI3	7F	AB	X
HDMI4	7F	9B	X
RGB	X	X	98

Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	78 03 0C 00 10 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI2	78 03 0C 00 20 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI3	78 03 0C 00 30 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI4	78 03 0C 00 40 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10
HDMI5	78 03 0C 00 50 00 B8 2D 20 C0 0E 01 40 0A 3C 08 10 18 10 98 10 58 10 38 10

4.3. White Balance Adjustment

4.3.1 Overview
(1) W/B adj. Objective & How-it-works
(2) Objective: To reduce each Panel's W/B deviation
(3) How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
(4) Adj. condition : normal temperature
   1) Surrounding Temperature : 25 ℃ ± 5 ℃
   2) Warm-up time: About 5 Min
   3) Surrounding Humidity : 20 % ~ 80 %

4.3.2 Equipment
1) Color Analyzer: CA-210 (LED Module : CH 14)
2) Adj. Computer(During auto adj., RS-232C protocol is needed)
3) Adjust Remote control
4) Video Signal Generator MSPG-925F 720p/216-Gray
   (Model: 217, Pattern: 78)
   -> Only when internal pattern is not available

■ Color Analyzer Matrix should be calibrated using CS-1000

4.3.3. Equipment connection MAP

* If TV internal pattern is used, not needed
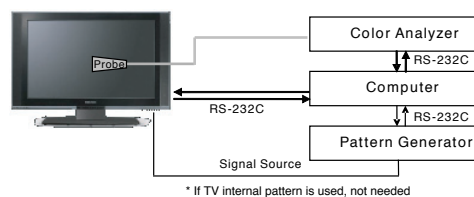
4.3.4. Adj. Command (Protocol)

<Command Format>

| START | 6E | A | 50 | A | LEN | A | 03 | A | CMD | A | 00 | A | VAL | A | CS | A | STOP |

- LEN: Number of Data Byte to be sent
- CMD: Command
- VAL: FOS Data value
- CS: Checksum of sent data
- A: Acknowledge
Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

■ RS-232C Command used during auto-adj.

RS-232C COMMAND			Explanation
[CMD	ID	DATA]	
wb	00	00	Begin White Balance adj.
wb	00	10	Gain adj.(internal white pattern)
wb	00	1f	Gain adj. completed
wb	00	20	Offset adj.(internal white pattern)
wb	00	2f	Offset adj. completed
wb	00	ff	End White Balance adj.(Internal pattern disappears)

Ex) wb 00 00   -> Begin white balance auto-adj.
   wb 00 10   -> Gain adj.
   ja 00 ff   -> Adj. data
   jb 00 c0
   ...
   ...
   wb 00 1f   -> Gain adj. completed
  *(wb 00 20(Start), wb 00 2f(completed)) -> Off-set adj.
   wb 00 ff   -> End white balance auto-adj.

■ Adj. Map

	ITEM	Command		Data Range(Hex.)		Default(Decimal)
		Cmd 1	Cmd 2	Min	Max	
Cool	R-Gain	j	g	00	C0	
	G-Gain	j	h	00	C0	
	B-Gain	j	i	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Medium	R-Gain	j	a	00	C0	
	G-Gain	j	b	00	C0	
	B-Gain	j	c	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Warm	R-Gain	j	d	00	C0	
	G-Gain	j	e	00	C0	
	B-Gain	j	f	00	C0	
	R-Cut					
	G-Cut					

4.3.5. Adjustment method

(1) Auto adjustment method
  1) Set TV in adj. mode using POWER ON key.
  2) Zero calibrate probe then place it on the center of the Display.
  3) Connect Cable. (RS-232C)
  4) Select mode in adj. Program and begin adjustment.
  5) When adjustment is complete (OK Sign), check adj. status pre mode.(Warm, Medium, Cool)
  6) Remove probe and RS-232C cable to complete adjustment.

  ■ W/B Adj. must begin as start command "wb 00 00" , and finish as end command "wb 00 ff", and Adj. offset if need.

(2) Manual adjustment method
  1) Set TV in Adjustment mode using POWER ON.
  2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10 cm of the surface.
  3) Press ADJ key -> EZ adjust using Adjustment remote control -> 7. White-Balance then press the cursor to the right(►) key.
    (When key(►) is pressed 216 Gray internal pattern will be displayed.)
  4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
  5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

  ■ If internal pattern is not available, use RF input. In EZ Adj. menu 7.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

  ■ Adj. condition and cautionary items
  1) Lighting condition in surrounding area
    Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
  2) Probe location : Color Analyzer(CA-210) probe should be within 10 cm and perpendicular of the module surface. (80° ~ 100°)
  3) Aging time
    - After Aging Start, Keep the Power ON status during 5 Minutes.
    - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

4.3.6. Reference(White Balance Adj. coordinate and temperature)

■ Luminance : 216 Gray
■ Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269	0.273	13000 K	0.0000
MEDIUM	0.285	0.293	9300 K	0.0000
WARM	0.313	0.329	6500 K	0.0000

■ Standard color coordinate and temperature using CA-210 (CH 14)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269 ± 0.002	0.273 ± 0.002	13000 K	0.0000
MEDIUM	0.285 ± 0.002	0.293 ± 0.002	9300 K	0.0000
WARM	0.313 ± 0.002	0.329 ± 0.002	6500 K	0.0000

4.3.7. ALELF & Edge LED White balance table

■ Edge LED module change color coordinate because of aging time.
■ Apply under the color coordinate table, for compensated aging time.

[ALELF]

GP3	Aging Time (Min.)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		269	273	285	293	313	329
1	0-2	285	297	301	317	321	340
2	3-5	284	296	300	316	320	339
3	6-9	283	294	299	314	319	337
4	10-19	282	292	298	312	318	335
5	20-35	279	287	295	307	315	330
6	36-49	275	281	291	301	311	324
7	50-79	273	278	289	298	309	321
8	80-149	271	275	287	295	307	318
9	Over 150	269	273	286	293	305	316

4.4. Wireless function check

Step 1) Connect set and Dongle of Wireless to Cable of HDMI & TTA 20Pin.
Step 2) At OSD of SET, check the message like Fig.3.
Step 3) Detach Cable of Wireless Dongle

Fig.1
<Dongle>
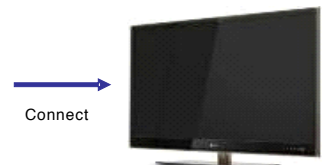
Connect

Fig.2
<Wireless Ready Set>
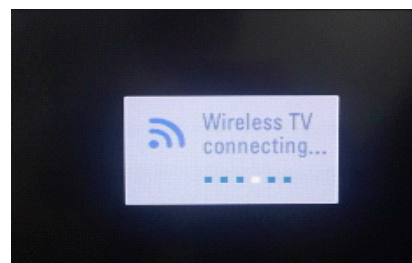
Fig.3 Connect the Dongle
(Dongle Connection Display)

4.5. EYE-Q function check

Step 1) Turn on TV.
Step 2) Press EYE key of Adjustment remote control.
Step 3) Cover the Eye Q II sensor on the front of the using your hand and wait for 6 seconds.
Step 4) Confirm that R/G/B value is lower than 10 of the "Raw Data(Sensor data, Back light)". If after 6 seconds, R/G/B value is not lower than 10, replace Eye Q II sensor.
Step 5) Remove your hand from the Eye Q II sensor and wait for 6 seconds.
Step 6) Confirm that "ok" pop up. If change is not seen, replace Eye Q II sensor.

4.6. Local Dimming Function Check

(1) Turn on TV.
(2) At the Local Dimming mode, module Edge Backlight moving Top to Bottom Back light of IOP module moving.
(3) Confirm the Local Dimming mode.
(4) Press "exit" key

Local Dimming Demo
(Edge LED Model)

Local Dimming Demo
(ALEF Model)

4.7. Magic Motion Remote control test

- Equipment : RF Remote control for test, IR-KEY-Code Remote control for test
- You must confirm the battery power of RF-Remote control before test.(recommend that change the battery per every lot)
- Sequence (test)
  1) if you select the 'start key(Mute)' on the controller, you can pairing with the TV SET.
  2) You can check the cursor on the TV Screen, when select the 'OK' key on the controller.
  3) You must remove the pairing with the TV Set by select 'Vol+(STOP)' key on the controller.

4.8. 3D function test

(Pattern Generator MSHG-600, MSPG-6100 [Support HDMI 1.4])
* HDMI mode No. 872, pattern No. 83)
1) Please input 3D test pattern like below.

2) When 3D OSD appear automatically, then select green key.

3) Don't wear a 3D Glasses, Check the picture like below.

4.9. RF emitter inspection

(1) Start 3D pattern inspection

<IR Emitter inspection>

<IR Tester Lamp turned off(NG)>   <IR Tester Lamp turned on(OK)>
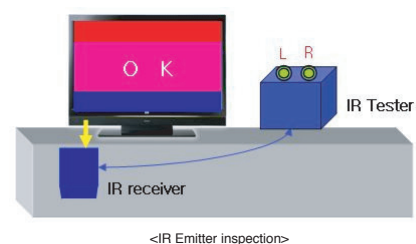
(2) If RF emitter signal is correctly received to RF receiver, the lamp of RF tester turn on.

4.10. Option selection per country

(1) Overview
- Option selection is only done for models in Non-EU.
- Applied model: LD12D/N Chassis applied EU model.

(2) Method
1) Press ADJ key on the Adjustment remote control, then select Country Group Menu.
2) Depending on destination, select Country Group Code 04 or Country Group EU then on the lower Country option, select US, CA, MX. Selection is done using +, - or ►◄ KEY.

4.11. Tool Option selection

- Method : Press Adj. key on the Adjustment remote control, then select Tool option.

4.12. Ship-out mode check(In-stop)

After final inspection, press IN-STOP key of the Adjustment remote control and check that the unit goes to Stand-by mode.

5. GND and Internal Pressure check
5.1. Method

1) GND & Internal Pressure auto-check preparation
- Check that Power Cord is fully inserted to the SET.
  (If loose, re-insert)
2) Perform GND & Internal Pressure auto-check
- Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
- Connect D-terminal to AV JACK TESTER
- Auto CONTROLLER(GWS103-4) ON
- Perform GND TEST
- If NG, Buzzer will sound to inform the operator.
- If OK, changeover to I/P check automatically.
  (Remove CORD, A/V form AV JACK BOX.)
- Perform I/P test.
- If NG, Buzzer will sound to inform the operator.
- If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

5.2. Checkpoint

· TEST voltage
  - GND: 1.5 KV/min at 100 mA
  - SIGNAL: 3 KV/min at 100 mA
· TEST time: 1 second
· TEST POINT
  - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
  - Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL
· LEAKAGE CURRENT: At 0.5 mArms

6. Audio

No.	Item	Min.	Typ.	Max.	Unit	
1.	Audio practical max Output, L/R (Distortion=10 % max Output)		10	12	W	EQ Off AVL Off
			8.9	9.8	Vrms	Clear Voice Off
2.	Speaker (8 Ω Impedance)		10	12	W	EQ On AVL On Clear Voice On

Measurement condition:
1. RF input: Mono, 1 KHz sine wave signal, 100 % Modulation
2. CVBS, Component: 1 KHz sine wave signal 0.4 Vrms
3. RGB PC: 1 KHz sine wave signal 0.7 Vrms

7. USB S/W download(option, Service only)

1) Put the USB Stick to the USB socket.
2) Automatically detecting update file in USB Stick.
   - If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.
3) Show the message "Copying files from memory".
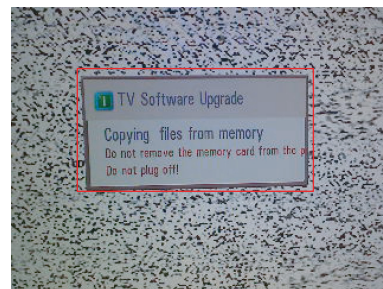
4) Updating is starting.
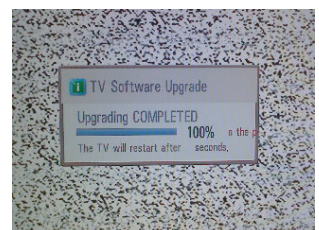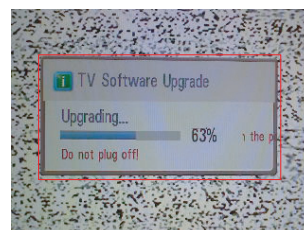
5) Updating Completed, The TV will restart automatically.
6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
   * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust TOOL OPTION again.
   1) Push "IN-START" key in service remote control.
   2) Select "Tool Option 1" and push "OK" key.
   3) Punch in the number.(Each model has their number.)

EXPLODED VIEW

NAND FLASH MEMORY 8Gbit

IC102
TC58DVG330ETA00
NAND_8bit

16Gbit

IC102-*1
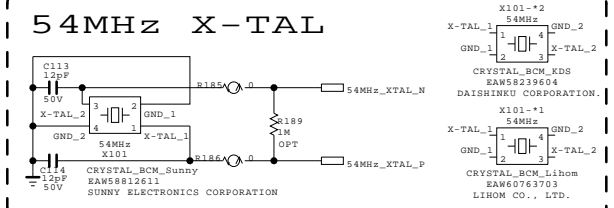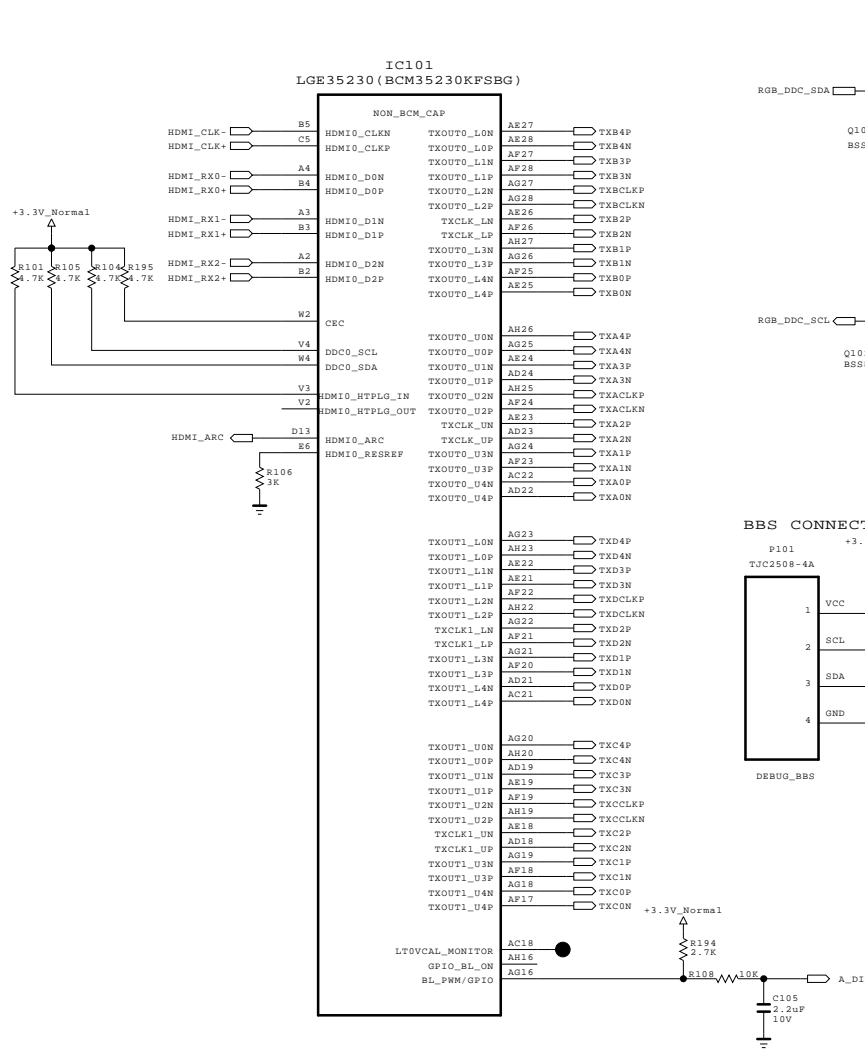TH58DVG480ETA20
DEV_NAND_16bit

Boot ROM Device Select - (FA4,FAD7,FAD2,FAD1)

```
0000: ST Micro M25P or compatible Serial Flash
0010: 8-bit 512Mbit 512B page SLC NAND Flash devices
0110: 8-bit 128, 256Mbit 512B page SLC NAND Flash devices
0100: 8-bit 1Gbit 2KB page SLC NAND Flash devices
1000: 8-bit 2Gbit, 4Gbit, 8Gbit 2KB page SLC NAND Flash devices
1010: 8-bit 16Gbit, 32Gbit 4KB page SLC NAND Flash devices (O)
0001: 8-bit 8/16/32Gbit 2KB page MLC NAND Flash devices
0011: 8-bit 16/32Gbit 4KB page MLC NAND Flash devices
0101: 8-bit 16Gbit, 32Gbit 8KB page MLC NAND Flash devices
0111: 3B dual IO Serial Flash
1001: BB dual IO Serial Flash
1011: fast Serail Flash > 50Mhs
1100: OneNAND Flash (always 16-bit)
1110: Reserved
1101, 1111: Reserved
```

NAND ECC (FA3, FA2, FALE)

```
000 = ECC diaabled
001 = ECC 1-bit repair
010 = ECC 4-bit BCH (O)
011 = ECC 8-bit BCH, 27 byte spare
100 = ECC 12-bit BCH, 27 byte spare
101 = ECC 8-bit BCH, 16 byte spare
110, 111 = Reservedd
```

DUAL COMPONENT

IC102	1ST : EAN61000101	2ND : T-TH58DVG4S0ETA20
IC102-*1		

Strap Setting

NAND_DATA[0]:
0: System is LITTLE endian (O)
1: System is BIG endian

CI_ADDR[7]:
0: Disable EDID automatic Downloading from Flash (O)
1: Enable EDID automatic Downloading from Flash

NAND_DATA[6] :
0: Disable OSC clock output on chip Pin (O)
1: Enable OSC clock output on chip pin.

CI_ADDR[6]:
0: Host MIPS run at 500 MHz (O)
1: Host MIPS run at 250 MHz

NAND_CLE:
0: Differential Oscillators TVM not bypassed (O)
1: Differential Oscillators TVM bypassed

NAND_DATA[4]:
0: 27MHz TVM Crystal Frequency
1: 54MHz TVM Crystal Frequency (O)

CI_ADDR[9],CI_ADDR[11],CI_ADDR[12],CI_ADDR[13]
TVM Crystal oscillator bias/gain control
0000: 210uA
0001: 390uA
0010: 570uA
0011: 730uA
0100: 890uA (O)
0111: 1290uA
1000: 1416uA
1111: 2196uA
0101, 0110, 1001, 1010, 1011, 1100, 1101, 1110: Reserved

CI_ADDR[8]:
0: RESETOUTb (in On/Off only) stay asserted until software releases them.
1: Fix amount of delay for de-assertion on RESETOUTb (in On/IOff only) at end of RESETb pulse (O)

NAND_DATA[3]:
0: MIPS will boot from external flash (O)
1: MIPS will boot from ROM

NAND_DATA[5]:
0: FLASH MODE (O)
1: BSC_SLAVE(WB3) MODE

IC101
LGE35230(BCM35230KFSBG)
NON_BCM_CAP

BBS CONNECT
P101
TJC2508-4A

DEBUG_BBS

IC101
LGE35230(BCM35230KFSBG)
NON_BCM_CAP

BCM REFRENCE is 562ohm

NVRAM

IC103
M24M01-HRMN6TP
A8'h

Write Protection
- Low : Normal Operation
- High : Write Protection

54MHz X-TAL

X101
CRYSTAL_BCM_Sunny
EAW58239604
SUNNY ELECTRONICS CORPORATION

X101-*2
CRYSTAL_BCM_KDS
EAW58239604
DAISHINKU CORPORATION

X101-*1
CRYSTAL_BCM_Lihom
EAW60763703
LIHOM CO. LTD.

THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECIFED PARTS BE USED FOR
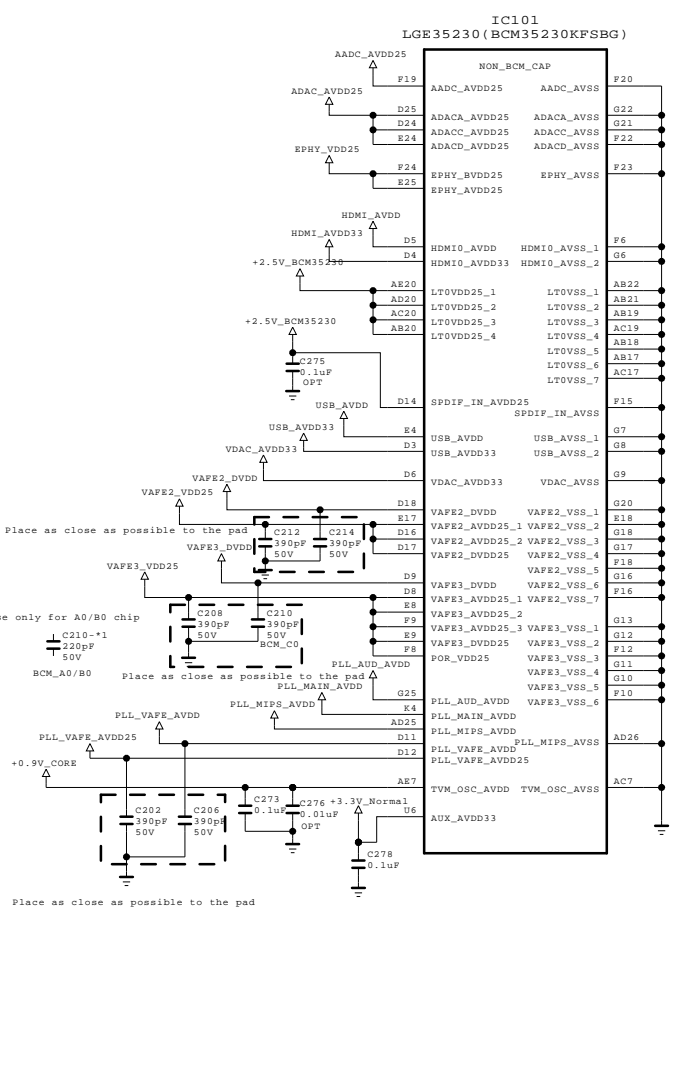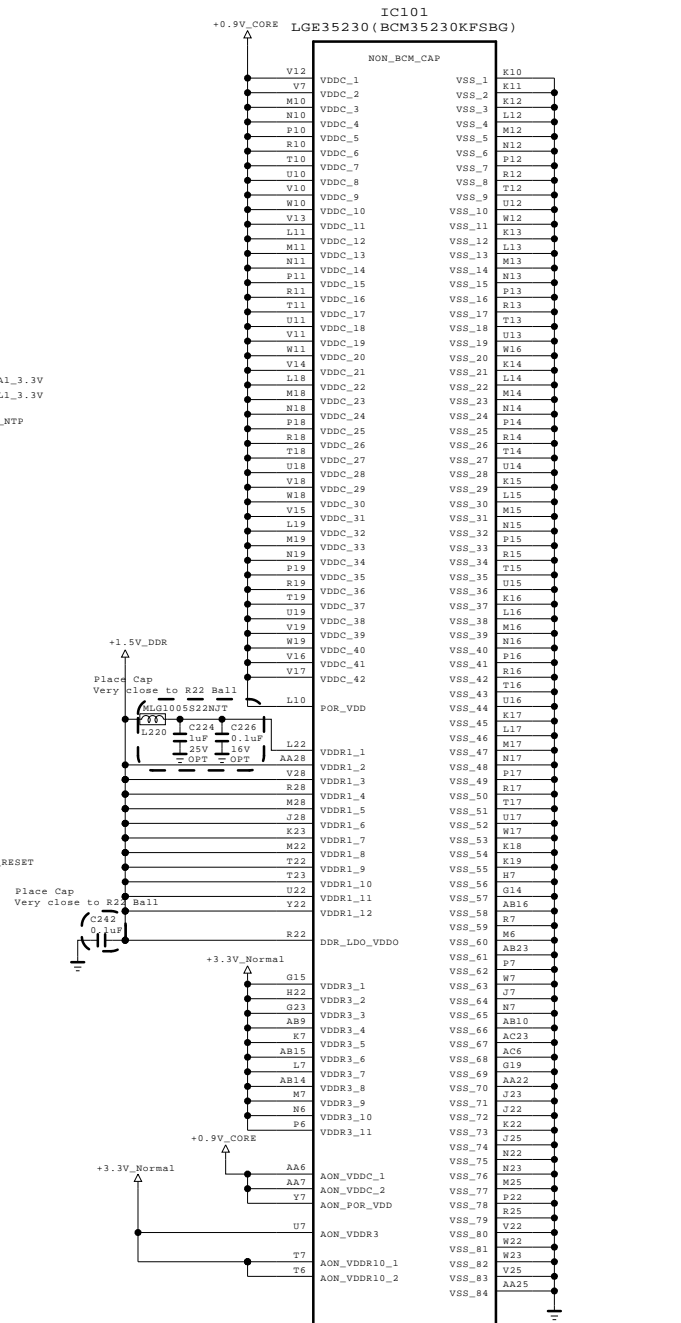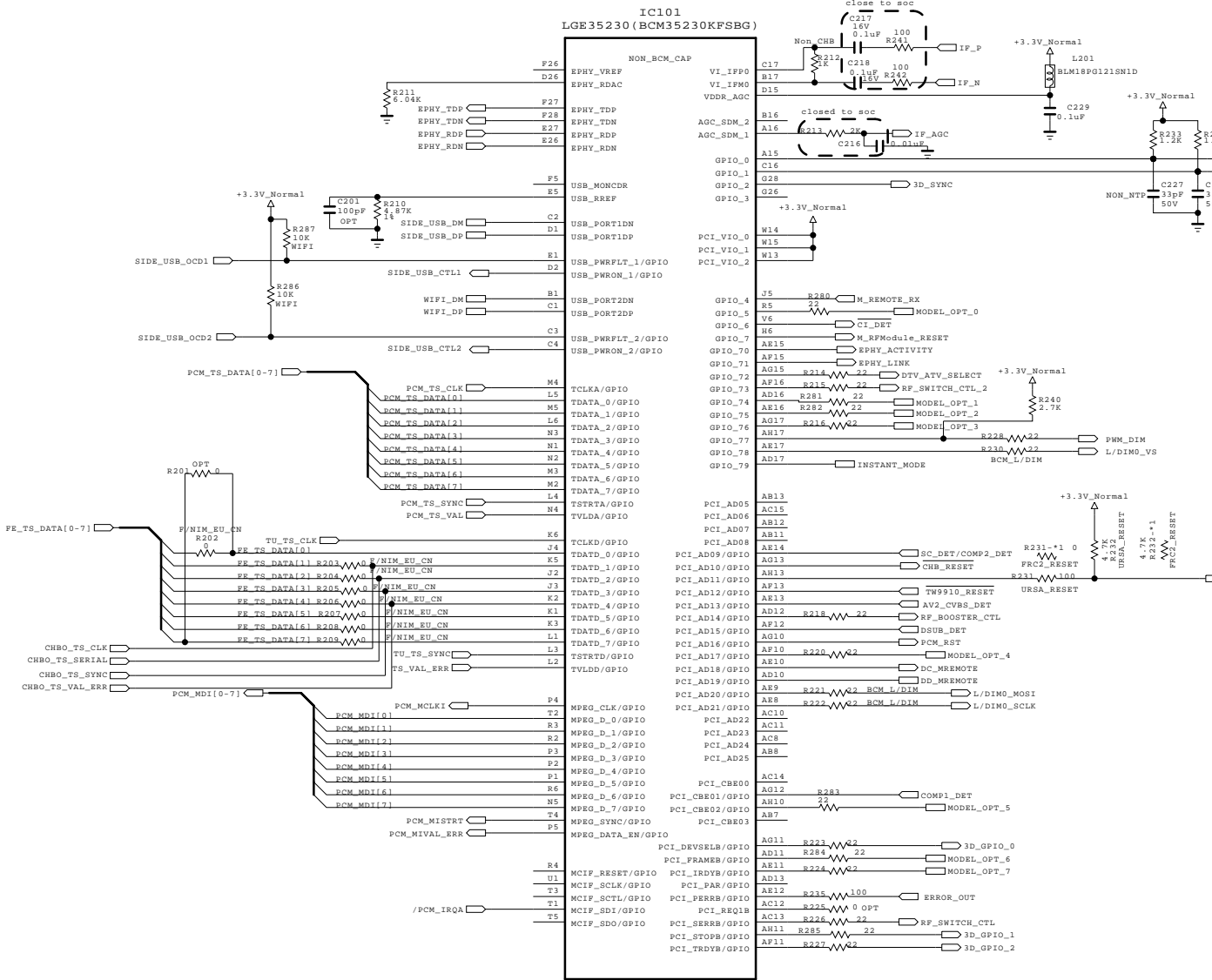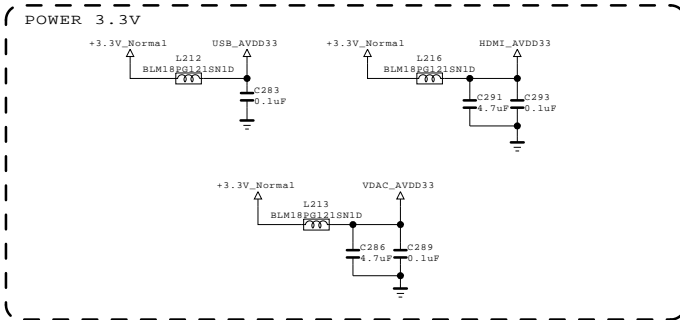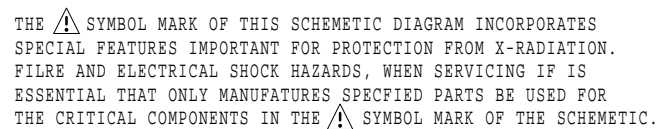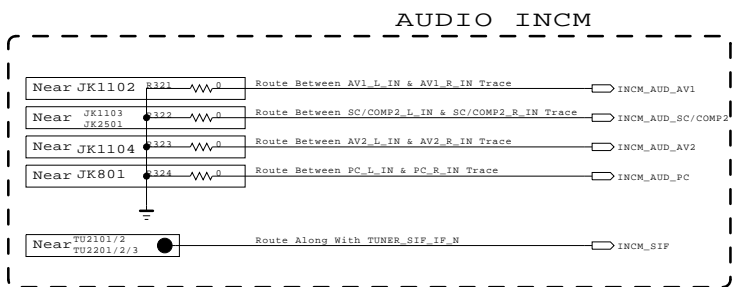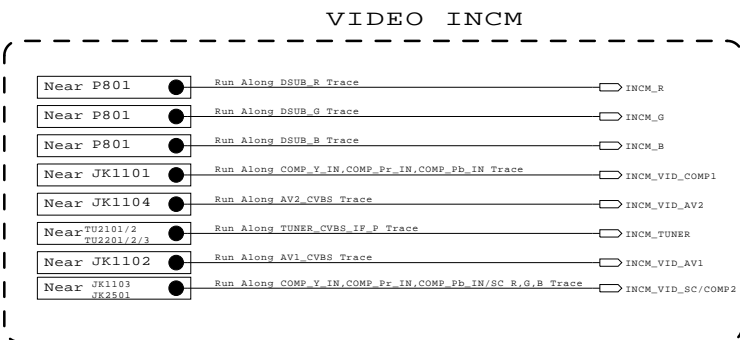THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.09.18
BLOCK	MAIN & NAND FLASH	SHEET	1

POWER 2.5V

CORE 0.9V

POWER 3.3V
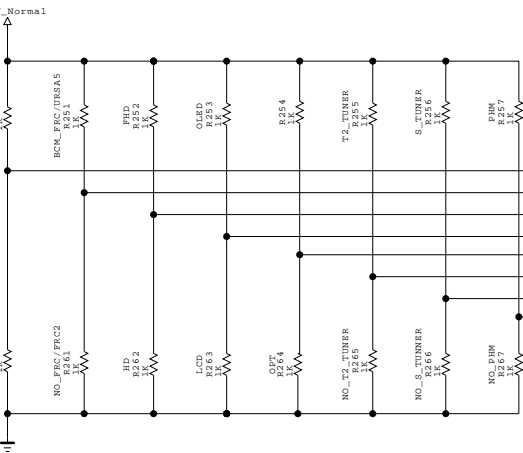
MODEL OPTION

	NO_FRC	BCM internal FRC	LG FRC2	external URSA5
MODEL_OPT_0	0	0	1	1
MODEL_OPT_1	0	1	0	1

		HIGH	LOW
MODEL_OPT_2		FHD	HD
MODEL_OPT_3		OLED	LCD
MODEL_OPT_4	DDR speed	1333	1600
MODEL_OPT_5	T2 Tuner	Support	Not Support
MODEL_OPT_6	S Tuner	Support	Not Support
MODEL_OPT_7	PHM	Enable	Disable
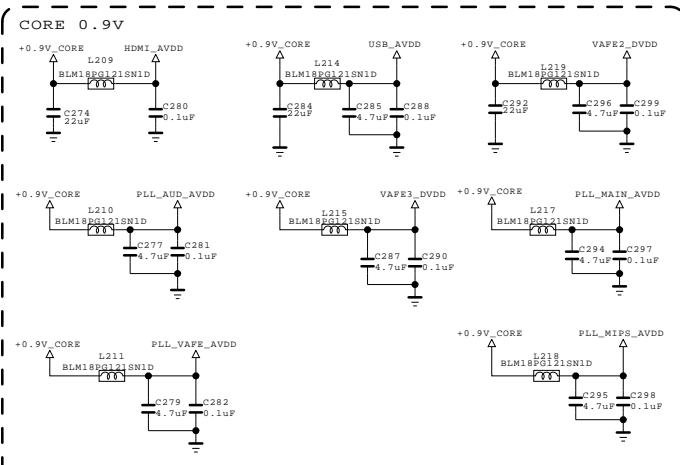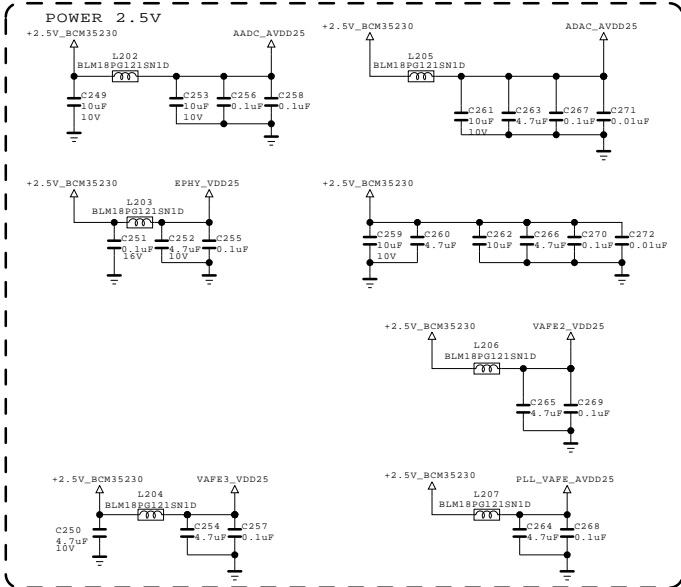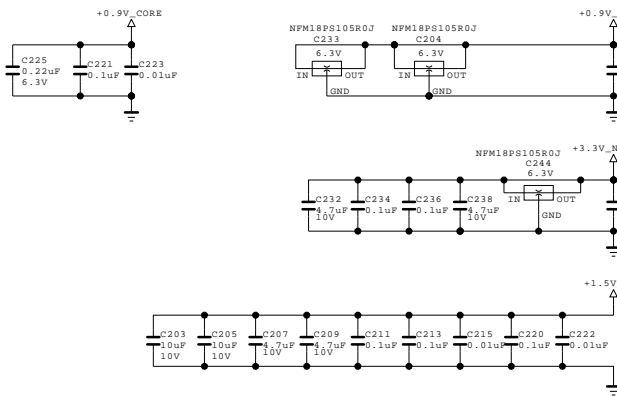
MODEL_OPT_0
MODEL_OPT_1
MODEL_OPT_2
MODEL_OPT_3
MODEL_OPT_4
MODEL_OPT_5
MODEL_OPT_6
MODEL_OPT_7

IC101
LGE35230(BCM35230KFSBG)

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MAIN POWER	SHEET	2 / 50

BCM35230_with_CAP_220pF

VIDEO INCM

AUDIO INCM

IC101
LGE35230(BCM35230KFSBG)

IC101-*1
LGE35230

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MAIN AUDIO/VIDEO	SHEET	3 / 50

DDR STRAP

DDR_DQ[0]
DDR_DQ[1]
DDR_DQ[2]
DDR_DQ[3]
DDR_DQ[4]

R401 R403 R405 R407 R409
4.7K 4.7K 4.7K 4.7K 4.7K
OPT
DDR_1333 DDR_1333

JEDEC Types : DDR_DQ[0:4]
00001 : DDR3-1333K (CasL=9)
10101 : DDR3-1600K (CasL=11) (O)

DDR_DQ[10]
DDR_DQ[9]
DDR_DQ[7]
DDR_DQ[8]
DDR_DQ[6]
DDR_DQ[5]

R402 R432 R404 R406 R408 R410
4.7K 4.7K 4.7K 4.7K 4.7K 4.7K
OPT OPT OPT OPT OPT OPT

Bus Width : DDR_DQ[10]
0 - 16b
1 - 32b (O)
Chip Width : DDR_DQ[8]
0 - 8b
1 - 16b (O)
Chip Size : DDR_DQ[6:5]
00 - 4Gbit
01 - 2Gbit (O)
10 - 1Gbit
11 - 512Mbit

DUAL COMPONENT

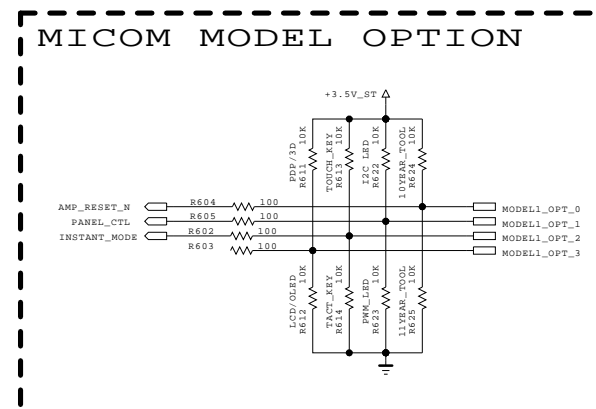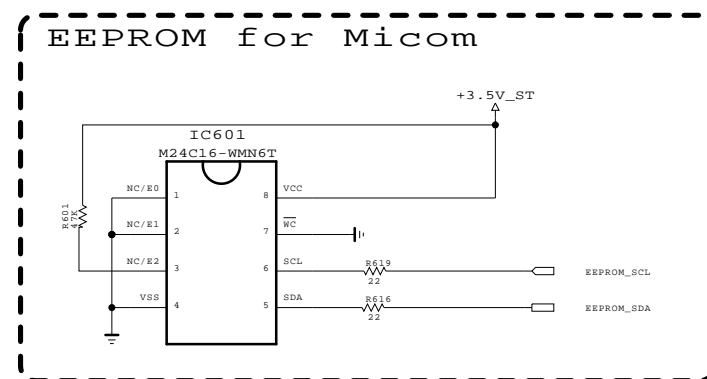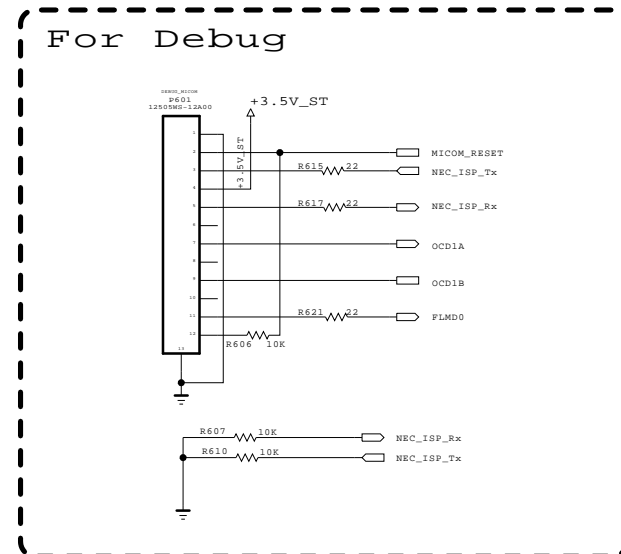|	
IC401,IC402	1ST : EAN61667501, 2ND : EAN61570701
IC401-*1 IC402-*1	1ST : T-K4B2G1646B_HCK0, 2ND : T-H5TQ2G63BFR-PBC

IC101
LGE35230(BCM35230KFSBG)

IC401
K4B2G1646C

IC402
K4B2G1646C

IC401-*1
K4B2G1646C-HCK0

IC402-*1
K4B2G1646C-HCK0

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MAIN DDR	SHEET	4 / 50

NEC MICOM

For Debug

+3.5V_ST

R601
12SYEWD-12AGG

R615 22 — MICOM_RESET
R617 22 — NEC_ISP_Tx
— NEC_ISP_Rx
— OCD1A
— OCD1B
R621 22 — FLMD0
R606 10K

R607 10K — NEC_ISP_Rx
R610 10K — NEC_ISP_Tx

EEPROM for Micom

+3.5V_ST

IC601
M24C16-WMN6T

NC/E0 VCC
NC/E1 WC
NC/E2 SCL   R613 22 — EEPROM_SCL
VSS   SDA   R616 22 — EEPROM_SDA

MICOM MODEL OPTION

+3.5V_ST

AMP_RESET_N R604 100 — MODEL1_OPT_0
PANEL_CTL   R605 100 — MODEL1_OPT_1
INSTANT_MODE R602 100 — MODEL1_OPT_2
             R603 100 — MODEL1_OPT_3

10Mhz Crystal

GND
C602 50V 13pF
C603 50V 13pF
X601 10MHz

+3.5V_ST
R617 OPT 47K
R639 10K
R641 0 — MICOM_DOWNLOAD
FLMD0

C606 15pF
X603 32.768KHz
C607 13pF
R642 4.7M OPT
MICOM_RESET
WIRELESS_DET
WIRELESS_PWR_EN
R643 22

+3.5V_ST
R644 47K
SW1
YTP-1127WEM
R645 270K OPT
C608 0.1uF 16V
DEBUG_MICOM_RESET

+3.5V_ST
C604 0.1uF
GND
C605 0.1uF
R647 20K 1/16W 1%
R646 2/16W 1%

IC602
uPD78F0514
NEC_MICOM

VDD 48
VSS 47
REGC 46
P121/X1/OCD0A 45
P122/X2/EXCLK/OCD0B 44
FLMD0 43
P123/XT1 42
P124/XT2/EXCLKS 41
RESET 40
P40 39
P41 38
P120/INTP0/EXLVI 37

SCL2_3.3V — R629 22 — P60/SCL0 1
SDA2_3.3V — R630 22 — P61/SDA0 2
EEPROM_SCL — P62/EXSCL0 3
EEPROM_SDA — P63 4
HDMI_CKC — R631 22 — P33/TI51/TO51/INTP4 5
POWER_ON/OFF2_1 — P75 6
AMP_MUTE — P74 7
MODEL1_OPT_0 — P73/KR3 8
SOC_RESET — R632 22 — P72/KR2 9
INV_CTL — P71/KR1 10
MODEL1_OPT_1 — P70/KR0 11
OCD1B — R633 OPT — P32/INTP3/OCD1B 12
S/T_SCL
R627 4.7K
+3.5V_ST

R628 4.7K
+3.5V_ST

36 P140/PCL/INTP6 — RL_ON
35 P00/TI000 — SCART_MUTE
34 P01/TI010/TO00 — EDID_WP
33 P130   R648 10K
32 P20/ANI0   Q601 2SC3052
31 ANI1/P21   R649 0 OPT
30 ANI2/P22 — MODEL1_OPT_3
29 ANI3/P23 — MODEL1_OPT_2
28 ANI4/P24 — POWER_ON/OFF1
27 ANI5/P25 — MICOM_DOWNLOAD
26 ANI6/P26 — SIDE_HP_MUTE
25 ANI7/P27 — KEY2
           — KEY1

13 P31/INTP2/OCD1A
14 P30/INTP1
15 P17/TI50/TO50
16 P16/TOH1/INTP5
17 P15/TOH0
18 P14/RXD6
19 P13/TXD6
20 P12/SO10
21 P11/SI10/RXD0
22 P10/SCK10/TXD0
23 AVREF
24 AVSS

+3.5V_ST
C609 1uF

+3.5V_ST
R636 4.7K
R638 22
R640 10K

S/T_SDA
OCD1A
POWER_DET
LED_N/LCD_LOGO
IR
LED_R/RGIZ
NEC_ISP_Rx
NEC_ISP_Tx
POWER_ON/OFF2_2
NEC_RXD
NEC_TXD

MODEL OPTION

PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	8	10YEAR_TOOL (10 SENSOR)	11YEAR_TOOL (11 SENSOR)
MODEL_OPT_1	11	I2C_LED	PWM_LED
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY
MODEL_OPT_3	31	PDP/3D	LCD/OLED

	LCD	PDP	OLED	3D
MODEL_OPT_3	0	1	0	1

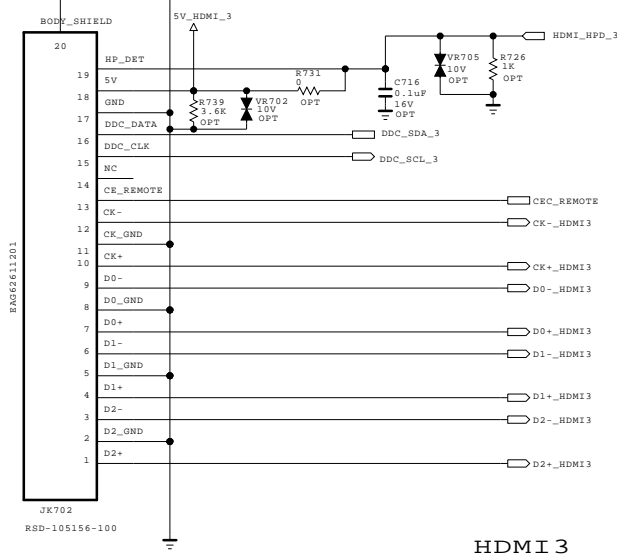|	LOW	LOW_SMALL	TBD	HIGH
MODEL_OPT_1	0	0	1	1
MODEL_OPT_2	0	1	0	1
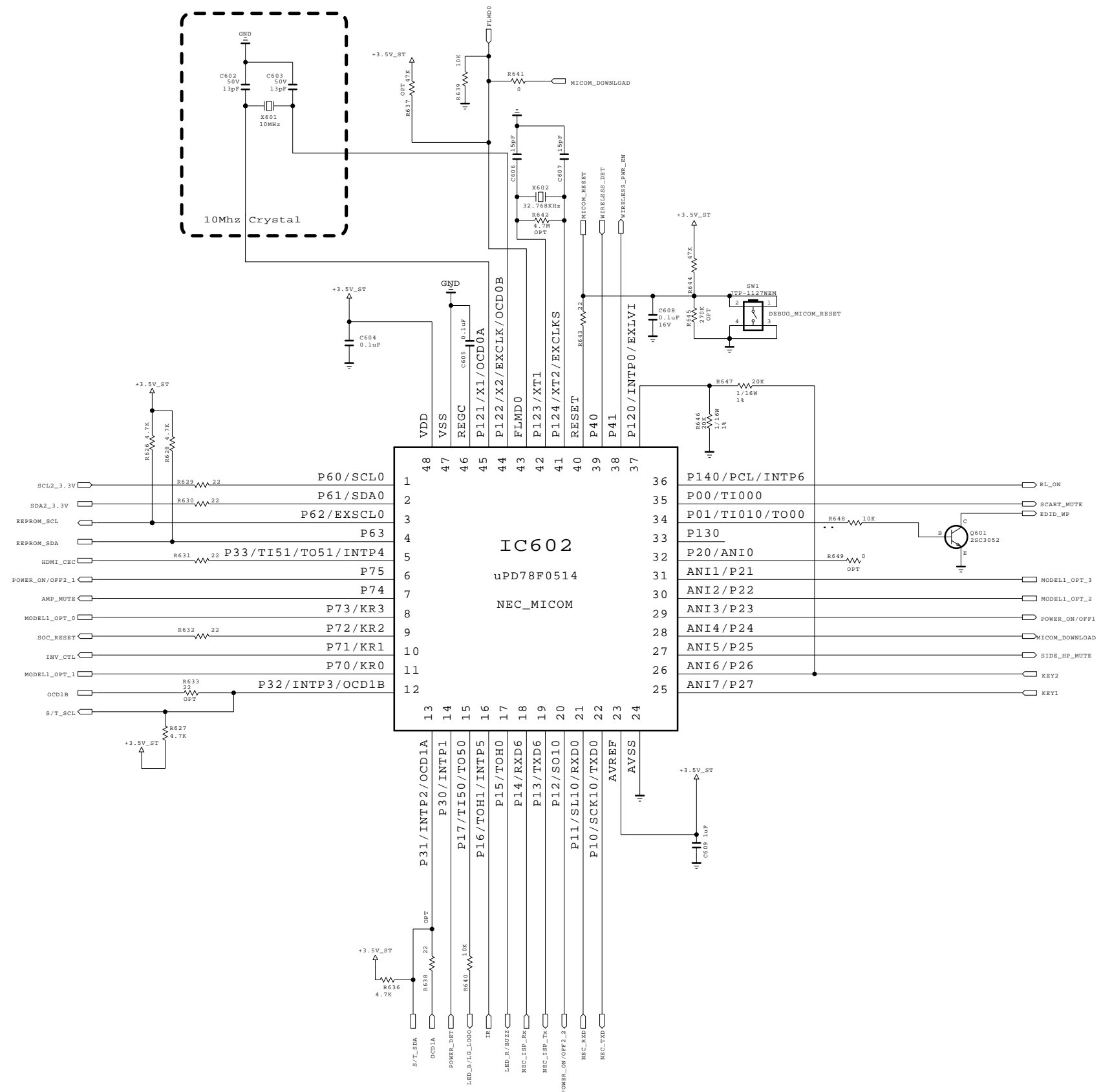
SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MICOM	SHEET	6 / 50

* HDMI CEC

HDMI1

HDMI4

HDMI2

EDID Pull-up
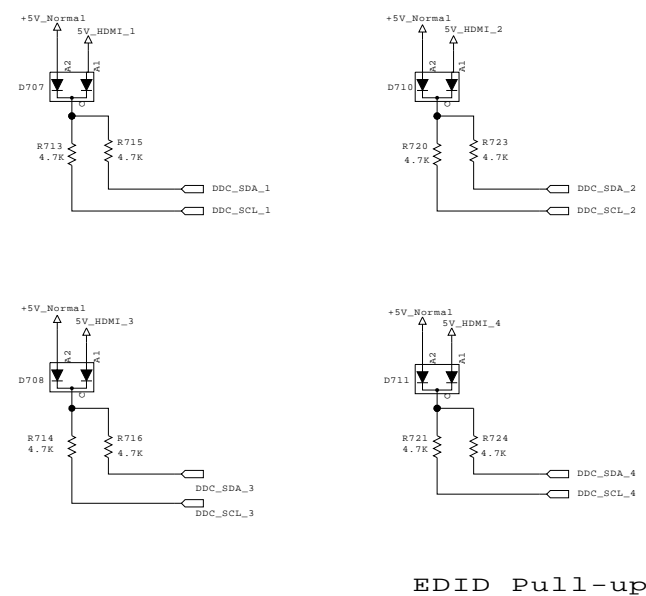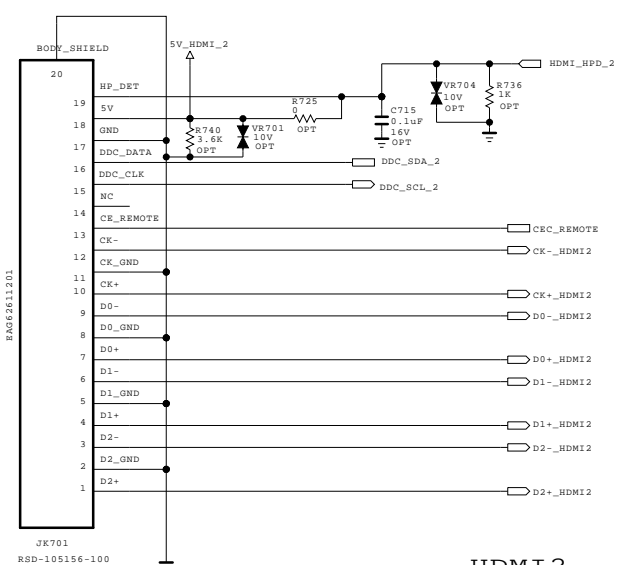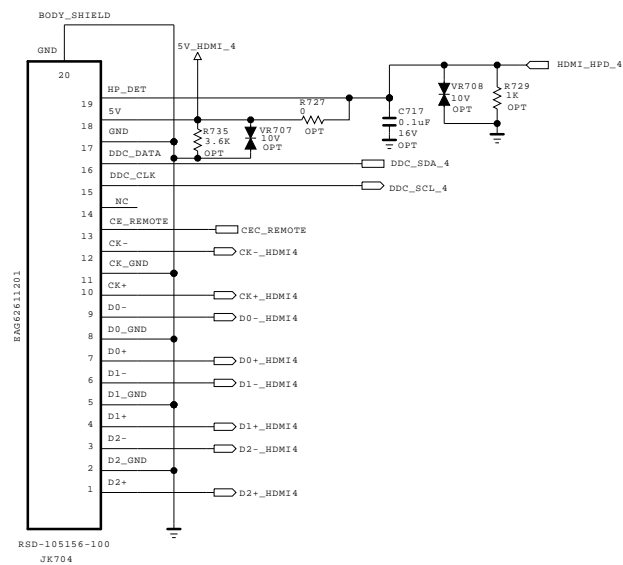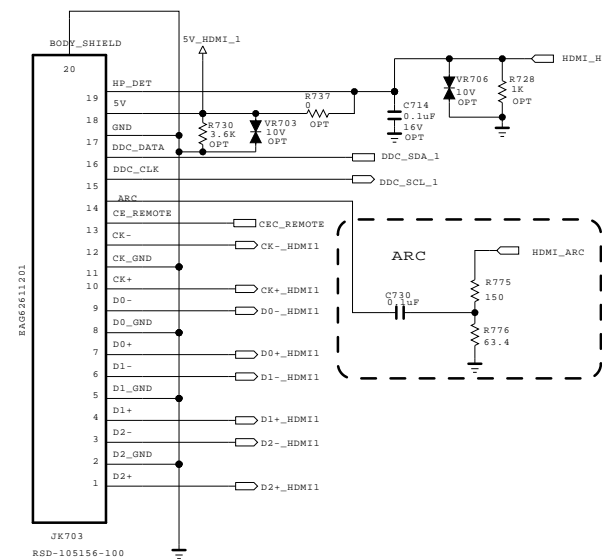
HDMI3

IC701
SII9287B

HDMI S/W OUTPUT

THERMAL
73

THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECIED PARTS BE USED FOR
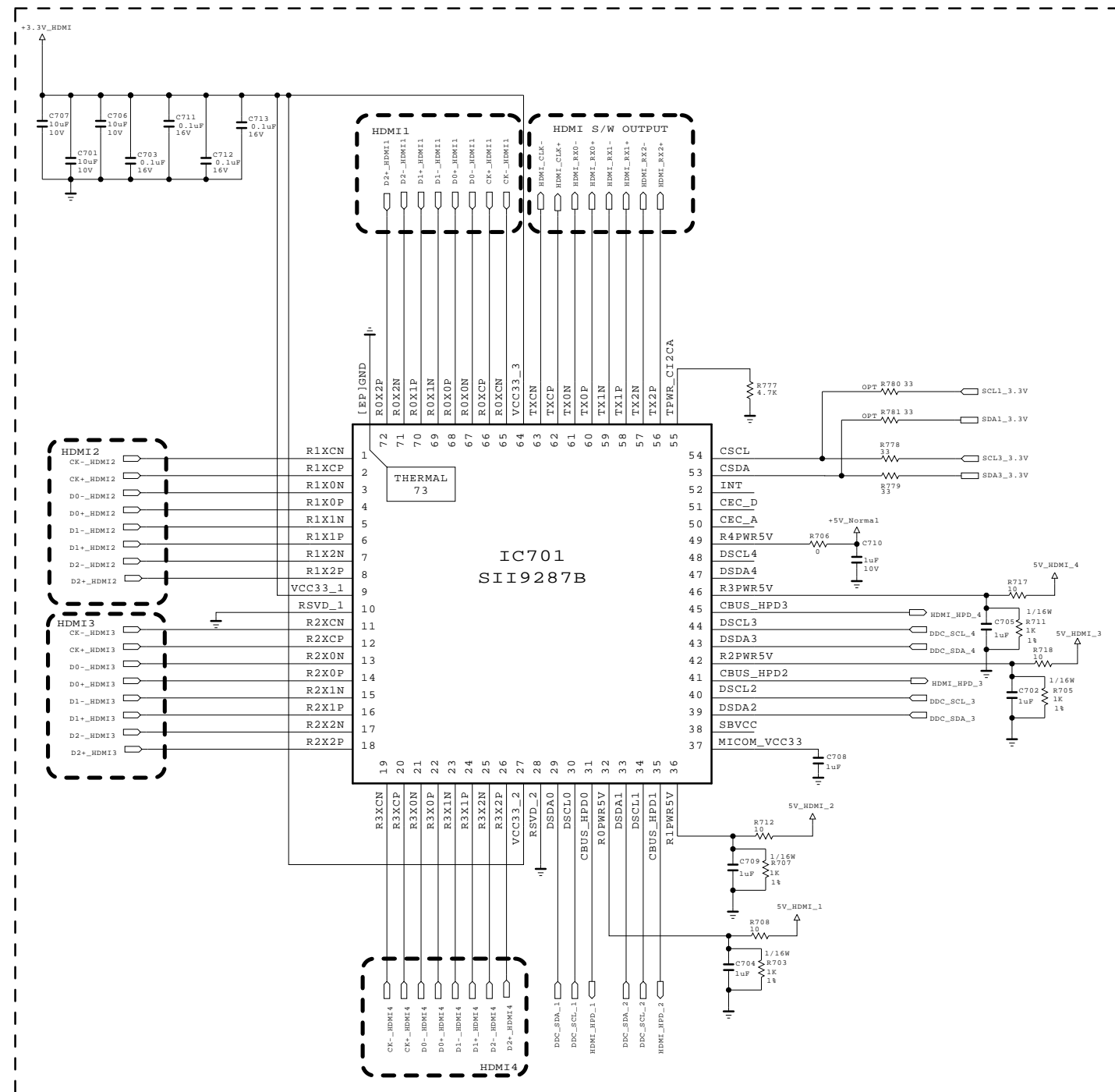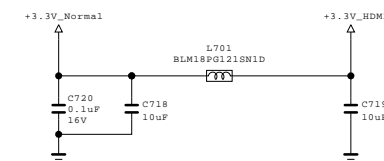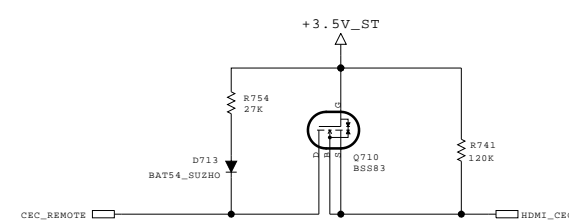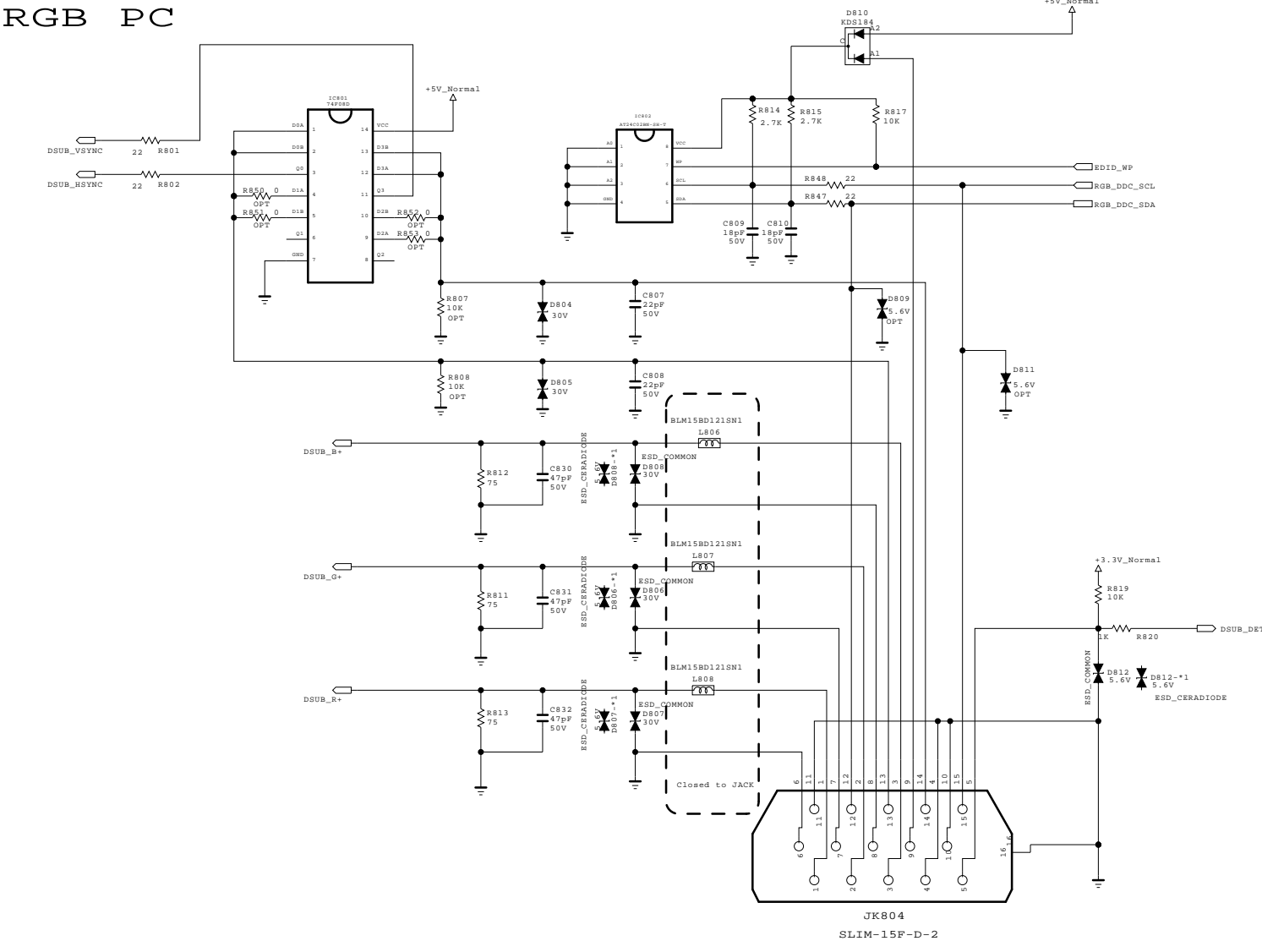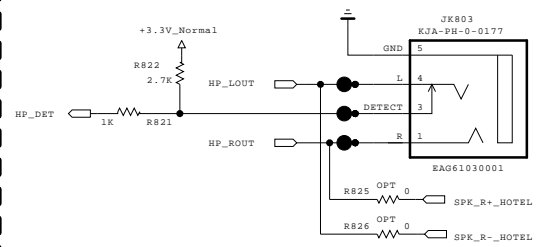THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | BCM35230 | DATE | |
| BLOCK | HDMI | SHEET | 7 / 31 |

RGB/ PC AUDIO/ SPDIF/ EARPHONE/ RS232C

RGB PC

DSUB_VSYNC 22 R801
DSUB_HSYNC 22 R802
+5V_Normal
+5V_Normal

IC801 TAPD80

IC802 AT24C16AN-10-T

R814 2.7K R815 2.7K R817 10K
R848 22 EDID_WP
R847 22 RGB_DDC_SCL
RGB_DDC_SDA

C809 18pF 50V C810 18pF 50V

R850 0 OPT
RGB_D_ 0 OPT
R851 0 OPT

D810 KDS184

R807 10K OPT D804 30V C807 22pF 50V D809 5.6V OPT
R808 10K OPT D805 30V C808 22pF 50V D811 5.6V OPT

+3.3V_Normal

R812 75 C830 47pF 50V ESD_CERADIODE BLM15BD121SN1 L806 ESD_COMMON D808 30V
R811 75 C831 47pF 50V ESD_CERADIODE BLM15BD121SN1 L807 ESD_COMMON D806 30V
R813 75 C832 47pF 50V ESD_CERADIODE BLM15BD121SN1 L808 ESD_COMMON D807 30V

DSUB_B+
DSUB_G+
DSUB_R+

R819 10K
R820
DSUB_DET
D812 5.6V D812-1 5.6V
ESD_COMMON ESD_CERADIODE

Closed to JACK

JK804 SLIM-15F-D-2

PC AUDIO

JK801 KJA-PH-0-0177 GND
D801 AMOTECH 5.6V
R804 470K C801 560pF 50V C804 560pF 50V R866 22 PC_L_IN
ESD_COMMON
DETECT
R867 22 PC_R_IN
D802 AMOTECH 5.6V
R805 470K C802 560pF 50V C805 560pF 50V
ESD_COMMON

SPDIF OUT

+3.3V_Normal
JK802 2PL1TC1-EM52-4F
VIN
VCC
R806 2.7K
SPDIF_OUT R803
D803 30V OPT C803 0.1uF 16V
Fiber Optic
GND
SHIELD

EARPHON JACK

+3.3V_Normal
R822 2.7K
HP_DET 1K R821
JK803 KJA-PH-0-0177
GND 5
HP_LOUT 4 1
DETECT 3
HP_ROUT 2
EAG61030001
R825 0 OPT SPK_R+_HOTEL
R826 0 OPT SPK_R-_HOTKL

EARPHONE AMP

+3.3V_Normal
L803 120-ohm BLM18PG121SN1D
C822 10uF 10V CR24 0.1uF 16V
C821 1uF 10V
Close to the IC
R868 L804 BG2013B080TF
C828 0.22uF 10V HP_LOUT
OUTL GND VDD EN
HP_LOUT_N C816 1uF 10V INL-
HP_LOUT_P C817 1uF 10V INL+
IC804 TPA6132A2 EAN60724701
HPVDD HPVSS CPP CPN
R837 100K OPT
+3.3V_Normal
R842 OPT R843
Q801 2SC3052
R844
SIDE_HP_MUTE
HP_ROUT_P C818 1uF 10V INR+
HP_ROUT_N C819 1uF 10V INR-
C825 2.2uF 10V C826 2.2uF 10V
R823 4.7K R824 OPT R828 4.7K
C823 2.2uF 10V
R869 L805 BG2013B080TF
C829 0.22uF 10V HP_ROUT
LPF READY (For H/P Noise Improvement)

RS232C

IC803 MAX3232CDR EAN41348201
+3.5V_ST
0.1uF C812 C1+ VCC 16
0.1uF C813 V+ GND 15
C1- DOUT1 14
0.1uF C814 C2+ RIN1 13
C2- ROUT1 12
0.1uF C815 V- DIN1 11
DOUT2 DIN2 10
RIN2 ROUT2 9

IR_OUT 0 R838 IR_OUT
100 R833
100 R834
ESD_COMMON D813 30V D814 30V ESD_CERADIODE
D811-1 5.6V D811-1 5.6V
+3.5V_ST
R860 4.7K OPT R861 4.7K OPT
SPD09-DB-009 JK805
R862 BCM_RX
R863 NEC_RXD
R864 BCM_TX
R865 NEC_TXD

DUAL COMPONENT

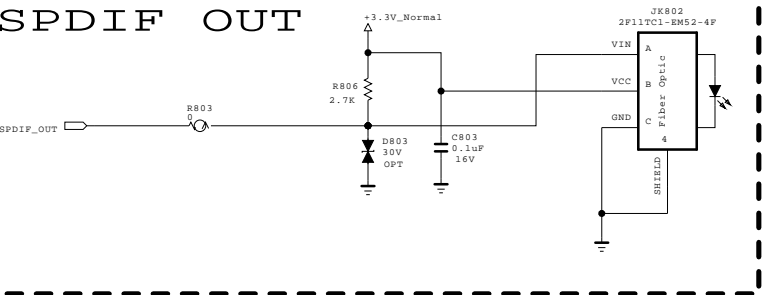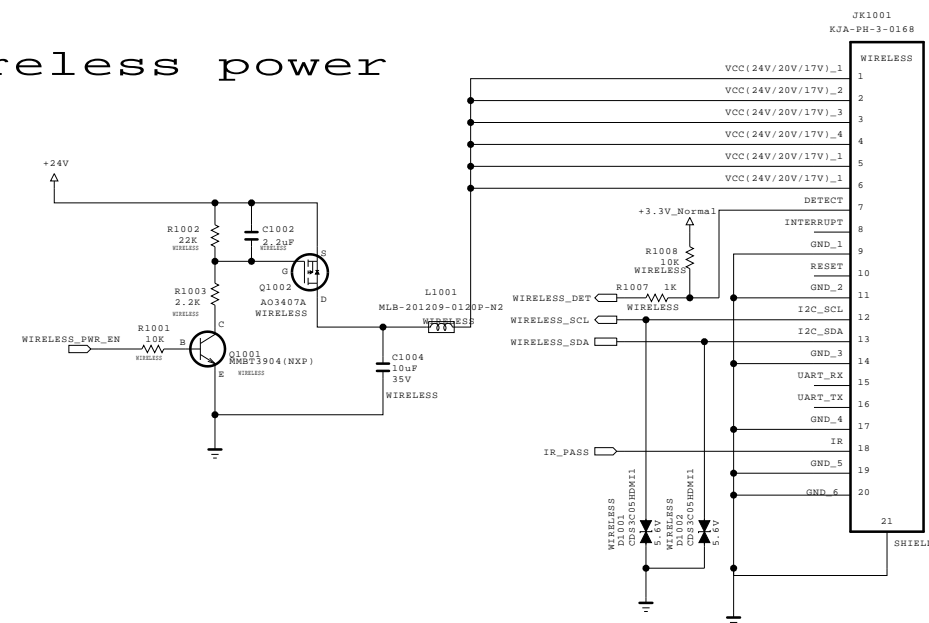|	1ST	2ND
D804,D805,D806 D807,D808,D813 D814	EAH39491601	EAH33945901
D810	0DD184009AA	0DSIH00028A
Q801	0TRIY80001A	0TR387500AA
IC805	EAN61151201	EAN61130001

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.10.21
BLOCK	COMMON JACK	SHEET	8 / 58

IR & KEY

DUAL COMPONENT

| Q901,Q902,Q903 Q904,Q905,Q906 | 1ST : 0TRIY80001A   2ND : 0TR387500AA |
| D903,D904 D905,D906 | 1ST : EAH42720601, 2ND : EAH60994401 |
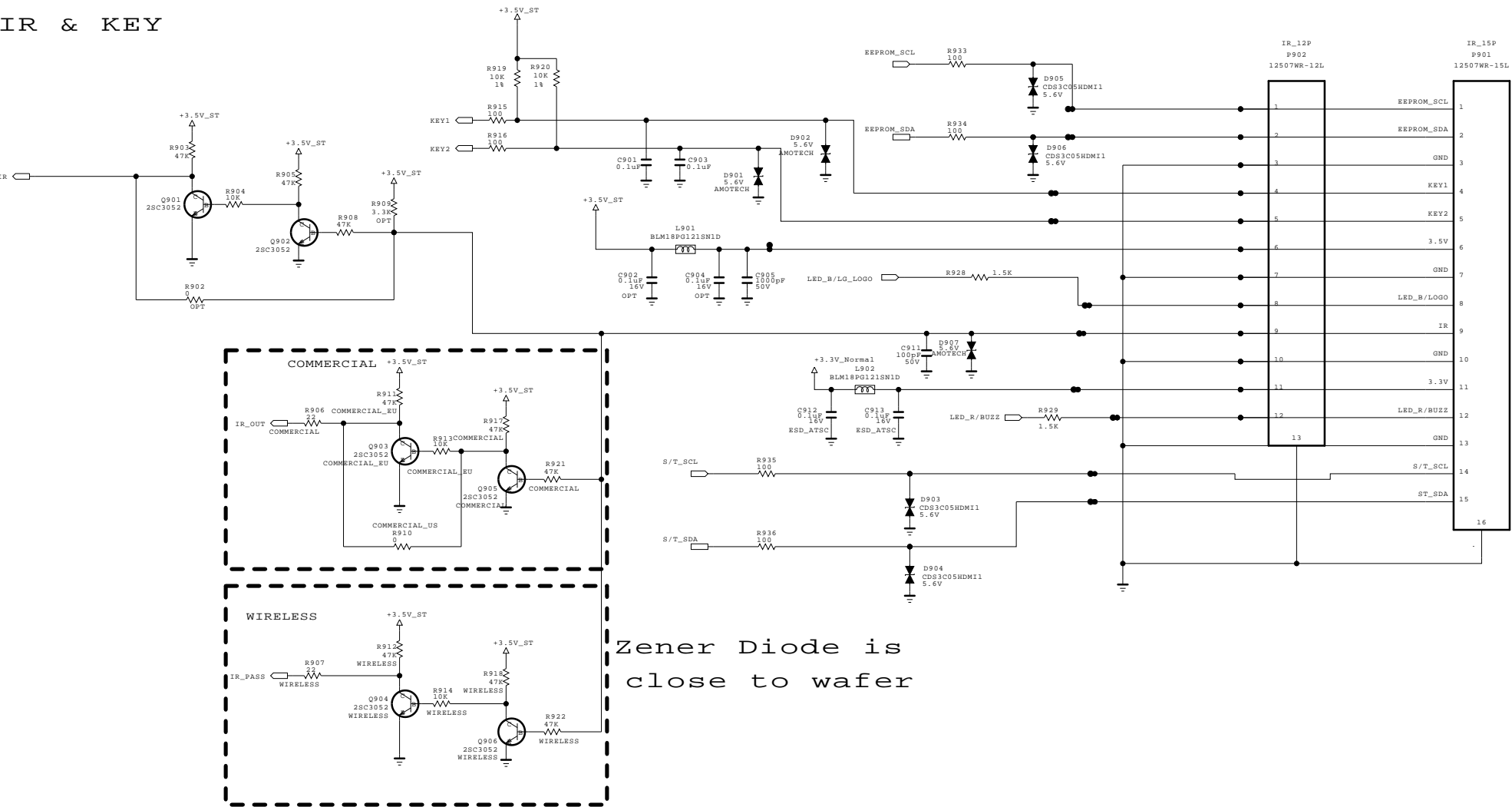
Zener Diode is
close to wafer

COMMERCIAL

WIRELESS

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | BCM35230 | DATE | |
| BLOCK | IR/KEY | SHEET | 9 / 50 |

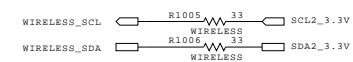# WIRELESS READY MODEL

DUAL COMPONENT	
D1001,D1002	1ST : EAH42720601 2ND : EAH60994401
Q1001	1ST : EBK61012601, 2ND : 0TRDI80002A
Q1002	1ST : EBK60752501, 2ND : EBK61011501

Wireless power

JK1001
KJA-PH-3-0168

WIRELESS

VCC(24V/20V/17V)_1   1
VCC(24V/20V/17V)_2   2
VCC(24V/20V/17V)_3   3
VCC(24V/20V/17V)_4   4
VCC(24V/20V/17V)_1   5
VCC(24V/20V/17V)_1   6
DETECT   7
INTERRUPT   8
GND_1   9
RESET   10
GND_2   11
I2C_SCL   12
I2C_SDA   13
GND_3   14
UART_RX   15
UART_TX   16
GND_4   17
IR   18
GND_5   19
GND_6   20
SHIELD   21

+24V

R1002
22K
WIRELESS
C1002
4.7uF
WIRELESS

R1003
2.2K
WIRELESS

Q1002
AO3407A
WIRELESS

R1001
10K
WIRELESS

WIRELESS_PWR_EN

Q1001
MMBT3904(NXP)
WIRELESS

L1001
MLB-201209-0120P-N2
WIRELESS

C1004
10uF
35V
WIRELESS

+3.3V_Normal

R1008
10K
WIRELESS
R1007 1K
WIRELESS

WIRELESS_DET

WIRELESS_SCL

WIRELESS_SDA

IR_PASS

WIRELESS
D1001
CDSU5S80K11
5.6V

WIRELESS
D1002
CDSU5S80K11
5.6V

Wireless I2C connection with I2C_1
Address : 0X20

WIRELESS_SCL   R1005   33   SCL2_3.3V
WIRELESS
WIRELESS_SDA   R1006   33   SDA2_3.3V
WIRELESS

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	WIRELESS	SHEET	10 / 50

CVBS 1 PHONE JACK

CVBS 2 REAR JACK

COMP 2 REAR JACK

COMPONENT 1 PHONE JACK

SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	COMP/AV	SHEET	11 / 50

USB_WIFI

+5V_USB

L1202 WIFI120-ohm
MLB-201209-0120P-N2

C1234 WIFI 0.1uF 16V
C1233 WIFI 0.1uF 16V

For EMI

+C1232 WIFI 100uF 16V

P1201
12507WR-04L
WIFI

Close to BCM IC

WIFI_DM   R1232 0   WIFI
WIFI_DP   R1233 0   WIFI

VDD 1
DM 2
DP 3
GND 4
5

D1201 CDS3C05HDMI1 5.6V WIFI_ESD
D1202 CDS3C05HDMI1 5.6V WIFI_ESD

DUAL COMPONENT

D1201,D1202 D1203,D1204 D1205,D1206	1ST : EAH42720601 2ND : EAH60994401

USB / DVR Ready

+3.3V_Normal
IC1204 AP2191DSG

L1205 MLB-201209-0120P-N2 120-ohm

+C1231 100uF 16V
C1220 10uF 10V

R1221 4.7K OPT
+5V_USB

EAN61849601

USB_CTL1
R1223 2.7K
C1224 0.1uF

3AU04S-305-ZC-(LG)
JK1201

USB DOWN STREAM

1 2 3 4 5

/USB_OCD1
R1230 0 SIDE_USB_CTL1
NON_WIFI
R1231 0 SIDE_USB_OCD1
NON_WIFI
USB_DM1
USB_DP1
NON_WIFI
R1224 0 SIDE_USB_DM
R1225 0 SIDE_USB_DP
NON_WIFI

D1207 RCLAMP0502BA
D1203 CDS3C05HDMI1 5.6V
D1205 CDS3C05HDMI1 5.6V

USB

+3.3V_Normal
IC1203 AP2191DSG

L1204 MLB-201209-0120P-N2 120-ohm

+C1230 100uF 16V
C1219 10uF 10V

R1220 4.7K OPT
+5V_USB

EAN61849601

USB_CTL2
R1222 2.7K
C1223 0.1uF

3AU04S-305-ZC-(LG)
JK1202

USB DOWN STREAM

1 2 3 4 5

/USB_OCD2
R1228 0 SIDE_USB_CTL2
NON_WIFI
R1229 0 SIDE_USB_OCD2
NON_WIFI
USB_DM2
USB_DP2
NON_WIFI
R1226 0 WIFI_DM
R1227 0 WIFI_DP
NON_WIFI

D1208 RCLAMP0502BA OPT
D1204 CDS3C05HDMI1 5.6V
D1206 CDS3C05HDMI1 5.6V

Center IC1202

WIFI C1209 0.1uF 10V
WIFI C1210 0.1uF 10V
SIDE_USB_DP
SIDE_USB_DM

WIFI C1211 0.1uF 3 WIFI
WIFI R1205 1M 1%

WIFI R1204 1/16W 1%
WIFI X1201 24MHz
R1206 100K WIFI
SUSP_IND/LOCAL_PWR/NON_REM[0]

+3.3V_Normal L1203 BLM18PG121SN1D WIFI +3.3V_USB

+3.3V_USB

C1215 0.1uF WIFI
R1212 100K OPT

R1213 100K OPT
C1218 0.1uF OPT
+3.3V_USB
/RST_HUB

IC1202
USB2512B-AEZG
WIFI

THERMAL 37

IEP1VSS VDD33_3 RBIAS PLLFILT XTALIN/CLKIN XTALOUT USBDP_UP USBDM_UP VDDA33_3

36 35 34 33 32 31 30 29 28 VBUS_DET
27 RESET_N
26 HS_IND/CFG_SEL[1]
25 SCL/SMBCLK/CFG_SEL[0]
24 VDD33_2
23 SDA/SMBDATA/NON_REM[1]
22 NC_7
21 NC_6
20 NC_5
19

+3.3V_USB
USB_DM1 USBDM_DN[1] 1
USB_DP1 USBDP_DN[1] 2
USB_DM2 USBDM_DN[2] 3
USB_DP2 USBDP_DN[2] 4
VDDA33_1 5
NC_1 6
NC_2 7
NC_3 8
NC_4 9
10 11 12 13 14 15 16 17 18
VDDA33_2 TEST /BC_EN[1] OCS_N[1] CRFILT VDD33_1 /BC_EN[2] OCS_N[2] NC_5

PRTPWR[1]/BC_EN[1] USB_CTL1
C1212 WIFI 1uF 10V
/USB_OCD1
WIFI C1214 0.1uF
PRTPWR[2]/BC_EN[2] USB_CTL2
/USB_OCD2

C1204 1uF 10V WIFI
C1205 0.1uF WIFI
C1206 0.1uF WIFI
C1207 0.1uF WIFI
C1208 0.1uF WIFI

R1215 100K OPT
R1214 100K OPT
R1216 100K OPT

R1207 100K WIFI
R1208 100K WIFI
R1209 100K WIFI
+3.3V_USB

WIFI C1216 0.1uF
WIFI C1217 4.7uF

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR
THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	USB + WIFI	SHEET	12 /

TI solution M_REMOTE OPTION

ALL M_REMOTE OPTION

SECRET

LGElectronics

🄛 LG ELECTRONICS

MODEL	BCM35230	DATE		
BLOCK	M_REMOCON	SHEET	13	50

Ethernet Block

+2.5V_BCM35230

L1401
MLB-201209-0120P-N2

C1401
0.1uF
16V

JK1401
XRJH-01A-4-DA7-180-LG(B)

Pin	Name	Signal
1	P1[CT]	
2	P2[TD+]	EPHY_TDP
3	P3[TD-]	EPHY_TDN
4	P4[RD+]	EPHY_RDP
5	P5[RD-]	EPHY_RDN
6	P6[CT]	
7	P7	
8	P8	
9	P9	
10	P10[GND]	
11	P11	
D1	YL_C	
R2	YL_A	R1401 240
D3	GN_C	
D4	GN_A	R1402 240
12	SHIELD	

D1401
5.5V
LAN_ESD

D1402
5.5V
LAN_ESD

D1404
5.5V
LAN_ESD

D1406
5.5V
LAN_ESD

+3.3V_Normal

EPHY_ACTIVITY

EPHY_LINK

D1403
5V
LAN_ESD

D1405
5V
LAN_ESD

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE		
BLOCK	ETHERNET	SHEET	14 /	50

FHD120Hz LVDS output(51pin+41Pin)

P1501
FI-RE51S-HFK-A

Pin	Signal
2	R1504 ⌇ 33 FRC2 → 3D_SYNC_RF
4	R1506 ⌇ 33 FRC2 → SDA2_3.3V
5	R1507 ⌇ 33 FRC2 → SCL2_3.3V
6	R1508 ⌇ 33 FRC2 → FRC_RESET
10	R1516 ⌇ 33 OPT → PANEL_CTL
12	TXA0N
13	TXA0P
14	TXA1N
15	TXA1P
16	TXA2N
17	TXA2P
19	TXACLKN
20	TXACLKP
22	TXA3N
23	TXA3P
24	TXA4N
25	TXA4P
28	TXB0N
29	TXB0P
30	TXB1N
31	TXB1P
32	TXB2N
33	TXB2P
35	TXBCLKN
36	TXBCLKP
38	TXB3N
39	TXB3P
40	TXB4N
41	TXB4P

LVDS_SEL

+3.3V_Normal

R1513
3.3K
LVDS_SEL_HIGH

R1514
10K
LVDS_SEL_LOW

BIT_SEL

R1512
10K
BIT_SEL_LOW

PANEL_VCC

L1501
MLB-201209-0120P-N2
NON_SHARP_60INCH

C1501   C1502   C1503
10uF   1000pF   0.1uF
25V   50V   16V
OPT

P1502
FI-RE41S-HFK-A

LVDS_41P

Pin	Signal
10	TXC0N
11	TXC0P
12	TXC1N
13	TXC1P
14	TXC2N
15	TXC2P
17	TXCCLKN
18	TXCCLKP
20	TXC3N
21	TXC3P
22	TXC4N
23	TXC4P
26	TXD0N
27	TXD0P
28	TXD1N
29	TXD1P
30	TXD2N
31	TXD2P
33	TXDCLKN
34	TXDCLKP
36	TXD3N
37	TXD3P
38	TXD4N
39	TXD4P

REVERSE MARK

LVDS_41P

C1504
2.2uF
50V

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.03
BLOCK	LVDS	SHEET	15 / 50

[Local Dimming Block]

P1601
12507WR-08L

L/Dim Wafer

Pin	Signal
1	
2	
3	L/DIM0_SCLK
4	
5	L/DIM0_MOSI
6	R1601 33 LPB_42/47/55 → SCL2_3.3V
7	R1602 33 LPB_42/47/55 → SDA2_3.3V
8	L/DIM0_VS
9	

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE		
BLOCK	L_DIMMING	SHEET	16 /	50

DUAL COMPONENT

Q1801 | 1ST : 0TRIY80001A   2ND : 0TR387500AA

IC1802
NTP-7400L
THERMAL 49

WOOFER AMP.

IC1801
NTP-7400L
THERMAL 49
WOOFER

AGND_PLL
AVDD_PLL
DVDD_PLL
LF
DGND_PLL
GND_1
DGND
DVDD
SDATA
WCK
BCK
SDA

[EP] VDD_IO CLK_I GND_IO AD /RESET BST1A PGND1A OUT1A_2 OUT1A_1 PVDD1_3 PVDD1_2 PVDD1_1

SCL /FAULT MONITOR0 MONITOR1 MONITOR2 BST2B PGND2B OUT2B_1 OUT2B_2 PVDD2_1 PVDD2_2 PVDD2_3

OUT1B_2
OUT1B_1
PGND1B
BST1B
VDR1
VCC_5
GND_2
VDR2
BST2A
PGND2A
OUT2A_2
OUT2A_1

SPEAKER_L
SPEAKER_R
WOOFER_L
WOOFER_R

SPK_L+
SPK_L-
SPK_R+
SPK_R-

SPK_WOOFER_L+
SPK_WOOFER_L-
SPK_WOOFER_R+
SPK_WOOFER_R-

AUD_LRCH
AUD_LRCK
AUD_SCK
SDA3_3.3V
SCL3_3.3V

AMP_RESET_N
AUD_MASTER_CLK
+3.3V_Normal
+24V
+24V_AMP

AMP_MUTE
SUB_MUTE
AMP_MUTE_NOTE1

P1801 SMAW250-H04R
P1801-*1 TJC2508-4A
P1802 SMAW250-05

SPK_WAFER_ANGLE
SPK_WAFER_STRIGHT

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	AUDIO[NEO]	SHEET	18 / 50

Q1901	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q1902	1ST : EBK60752501, 2ND : EBK61011501
IC1904	1ST : 0ISTLPH062A, 2ND : EAN40055001

Close to BCM35230

BCM INT Demod

CI TS INPUT

Close to BCM35230

Close to Tuner

Close to CI Slot

CI TS OUTPUT

CI CONTROL INTERFACE

NAND F/M Data

OE	DIR	CI_DATA	NAND_DATA
L	L	OUTPUT	INPUT
L	H	INPUT	OUTPUT
H	X	Z	Z

IC1903 74LVC245A

IC1905 74LVC245A

IC1901 CI 74LVC126APW

IC1902 74AHC08PW

CI POWER ENABLE CONTROL

3,3V_CI POWER

CI DETECT

P1901 10067972-000LF CI

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | BCM35230 | DATE | 2010.11.11 |
| BLOCK | CI | SHEET | 19 / 58 |

H/NIM & F/NIM & T/C/S2 Combo Tuner

OPTION TABLE

H/NIM (EU)	H/NIM (AU,Latin)	H/NIM (Brazil,Taiwan)	F/NIM_T/C	F/NIM_T2	F/NIM_CN (China)	F/NIM_Brazil (Brazil)	DVB-T/C/S2 (Eu,Aisa)
Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	Non_DVB_S	DVB_S
BOOSTER	H/NIM	H/NIM	F/NIM	F/NIM	F/NIM	F/NIM	F/NIM
	BOOSTER	BOOSTER	BOOSTER	BOOSTER	BOOSTER	BOOSTER	SCART
SCART		RF_SW_CTL			RF_SW_CTL	RF_SW_CTL	
			SCART	SCART	CN		
			EU_F/NIM		CN_F/NIM_BR	CN_F/NIM_BR	TC_S_F/NIM
			TC_S_F/NIM	TC_S_F/NIM	CN_F/NIM_BR		

NON_DVB_S : use H/NIM and F/NIM
DVB_S : use DVB-T/C/S2 combo Tuner
H/NIM : use H/NIM
F/NIM : use F/NIM and DVB-T/C/S2 combo NIM
SCART : use Scart Jack
CN : use China F/NIM
BOOSTER : use BOOSTER_CTL
RF_SW_CTL : use RF_SWITCH_CTL
TC_S_F/NIM : use EU_DVB-T/C F/NIM
CN_F/NIM_BR : use F/NIM(China. BRZIL)
EU_F/NIM : use EU_F/NIM
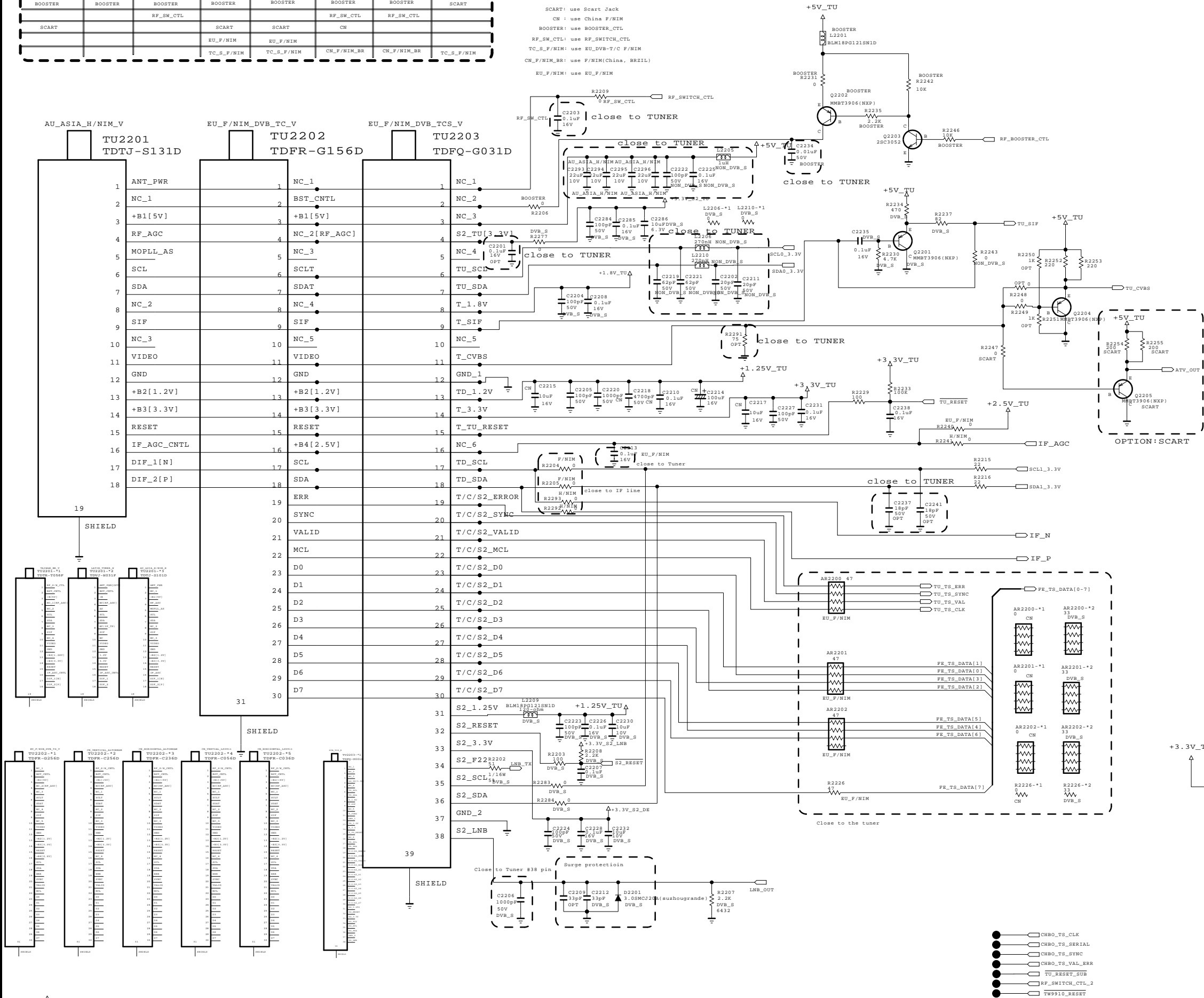
DUAL COMPONENT

IC2204	1ST:T-AP2114H(EAN61573601) / 2ND:T-TJ3940S (EAN61573501)
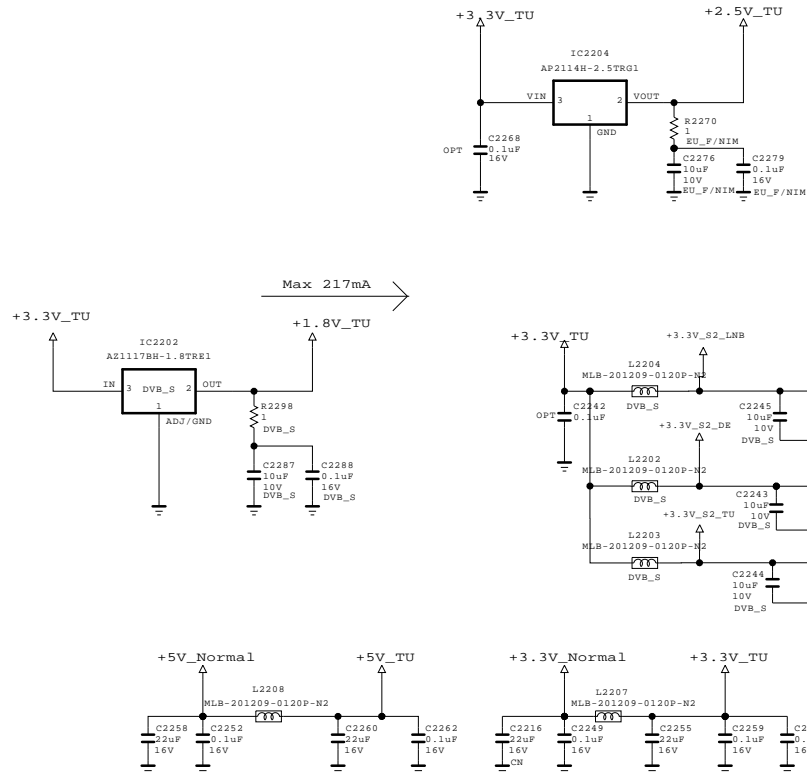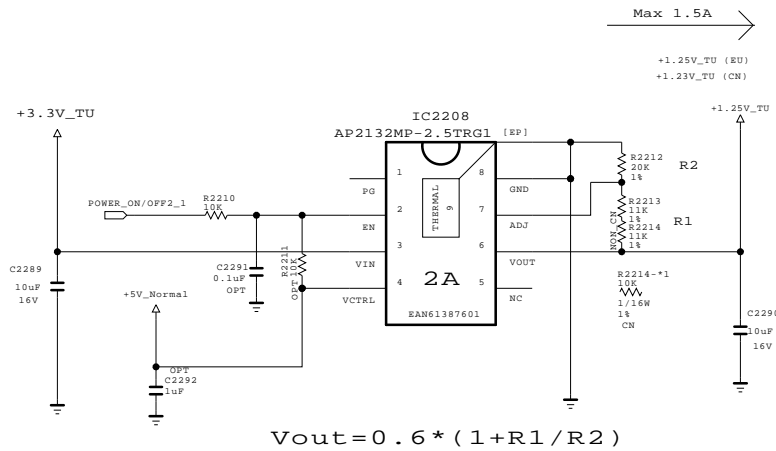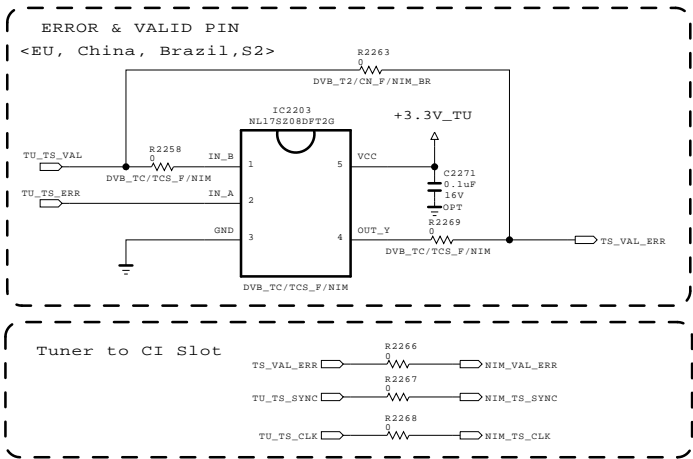
ERROR & VALID PIN
<EU, China, Brazil,S2>

IC2203 HL17S208DFT2G

Tuner to CI Slot

Vout=0.6*(1+R1/R2)

TU2201 TDTJ-S131D (AU_ASIA_H/NIM_V)
TU2202 TDFR-G156D (EU_F/NIM_DVB_TC_V)
TU2203 TDFQ-G031D (EU_F/NIM_DVB_TCS_V)

IC2208 AP2132MP-2.5TRG1 [EP] EAN61387601
IC2204 AP2114H-2.5TRG1
IC2202 AZ1117BH-1.8TRE1

THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.
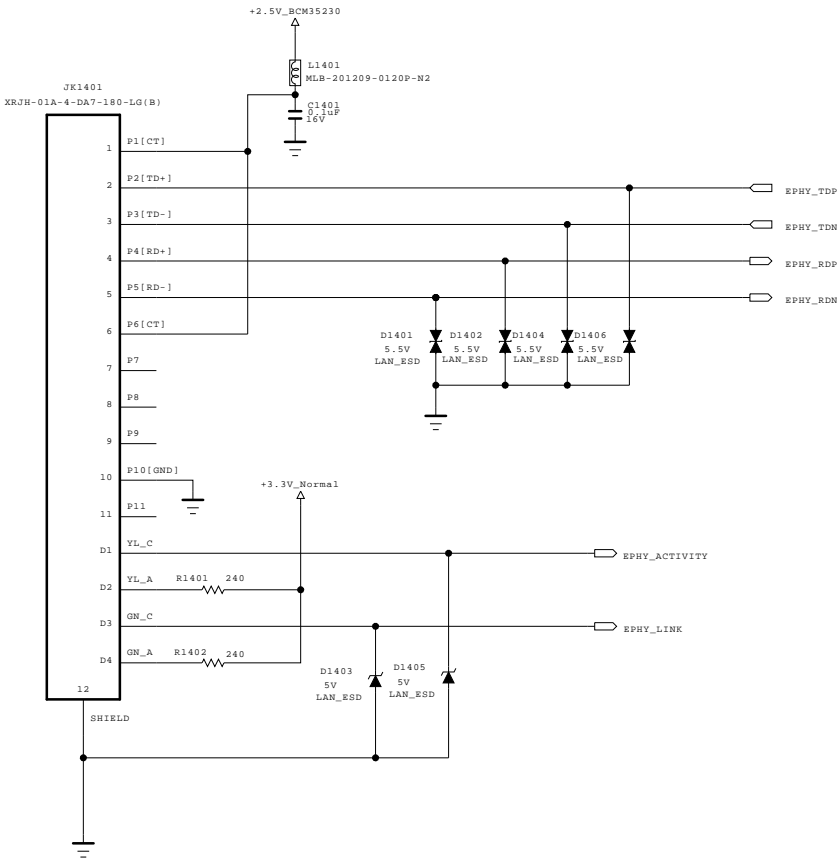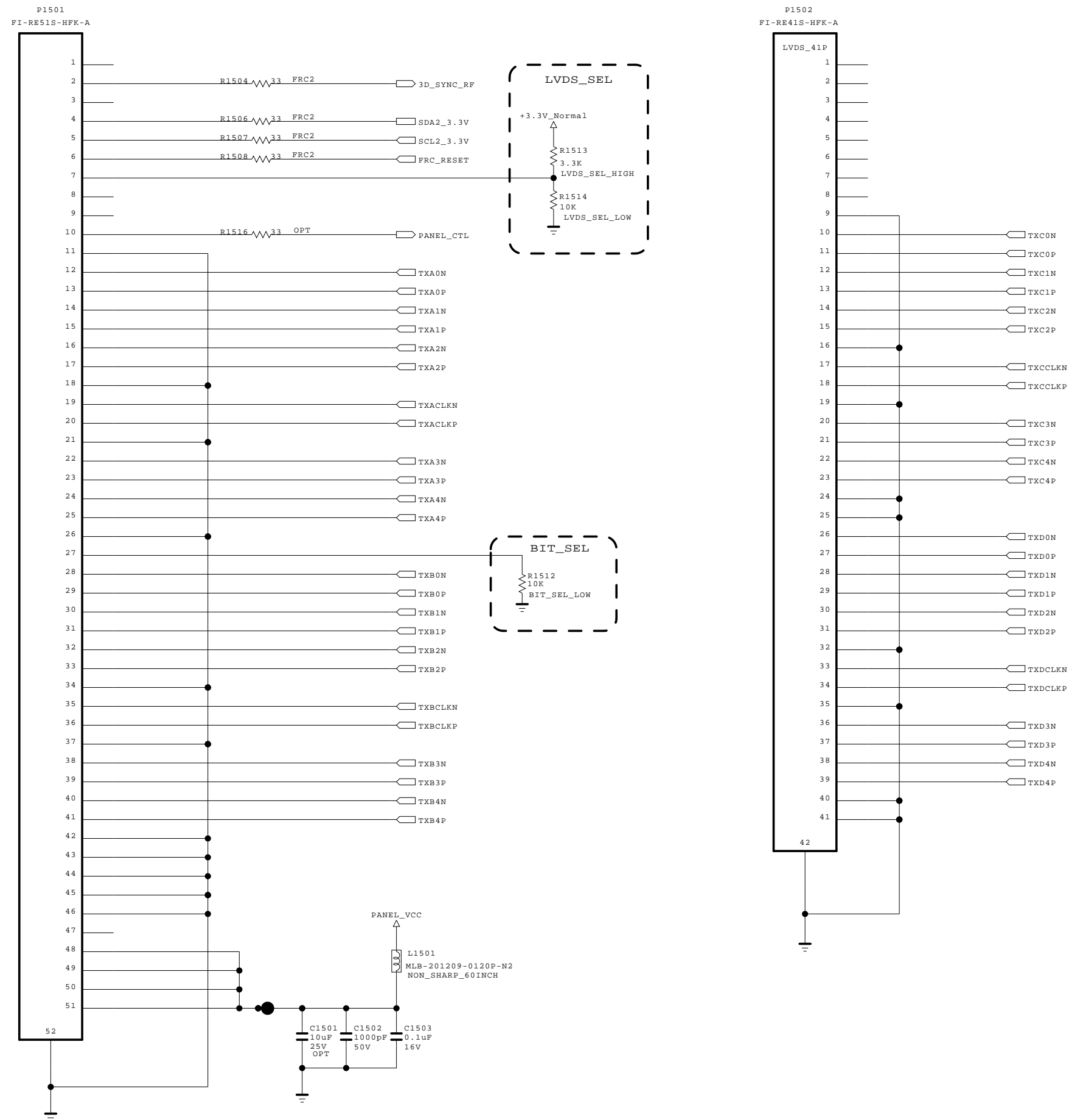
LG ELECTRONICS

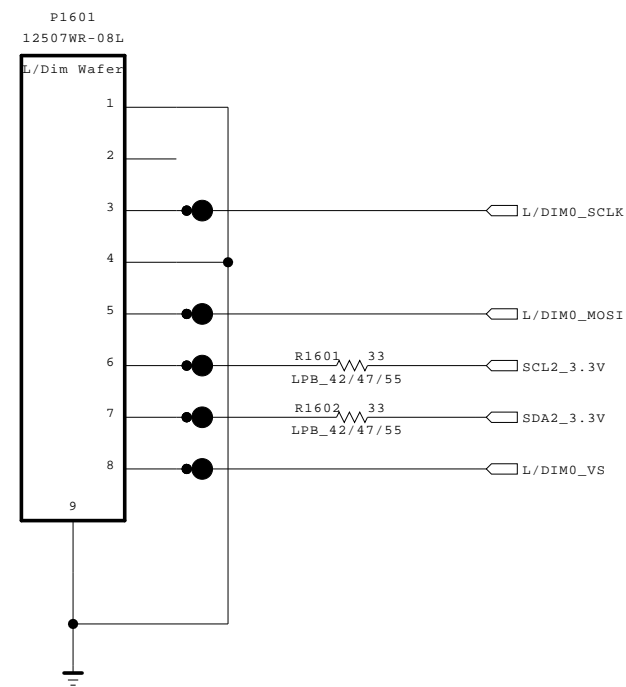| MODEL	BCM35230	DATE	
BLOCK	TUNER SINGLE	SHEET	22

DVB-S2 LNB Part Allegro

(Option:LNB)

DCDC_GND and A_GND are connected
DCDC_GND and A_GND are connected in pin#27
PCB_GND and A_GND are connected

Input trace widths should be sized to conduct at least 3A

Ouput trace widths should be sized to conduct at least 2A
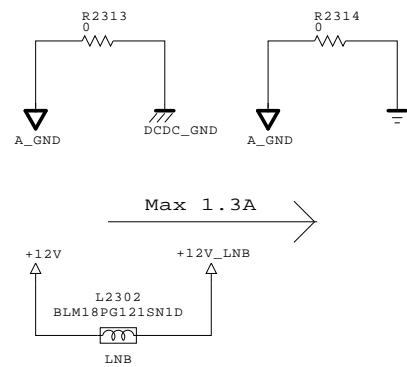
IC2301
A8290SETTR-T
LNB

Max 1.3A

L2302
BLM18PG121SN1D
LNB

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.02
BLOCK	LNB	SHEET	23 / 57

Full Scart(18 Pin Gender)

DUAL COMPONENT	
Q2502,Q2503 Q2504,Q2506 Q2507,Q2508	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q2501	1ST : EBK61012701, 2ND : EBK58172301
Q2505	1ST : 0TRIH80004A, 2ND : EBK61012501, 3RD : 0TR102009AM
D2513	1ST : T-BAT54_SUZHO, 2ND : 0DSON00138A
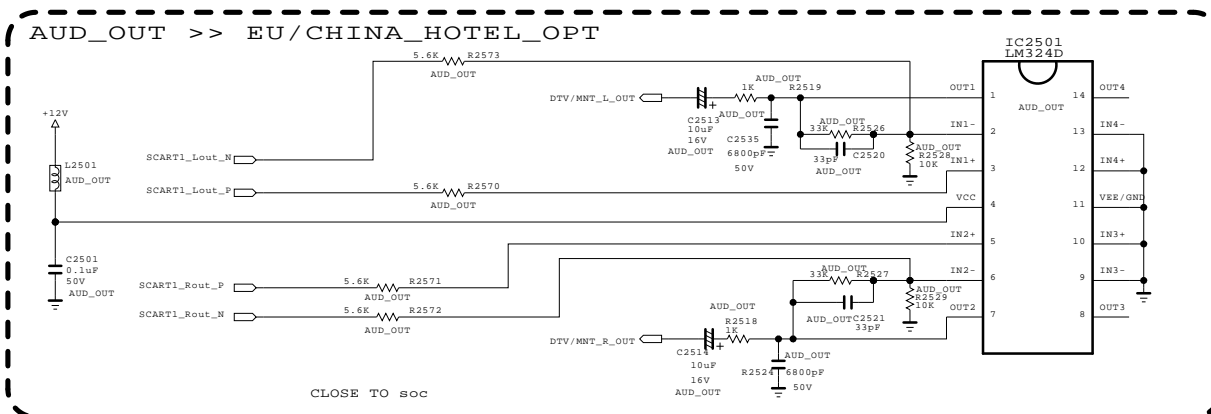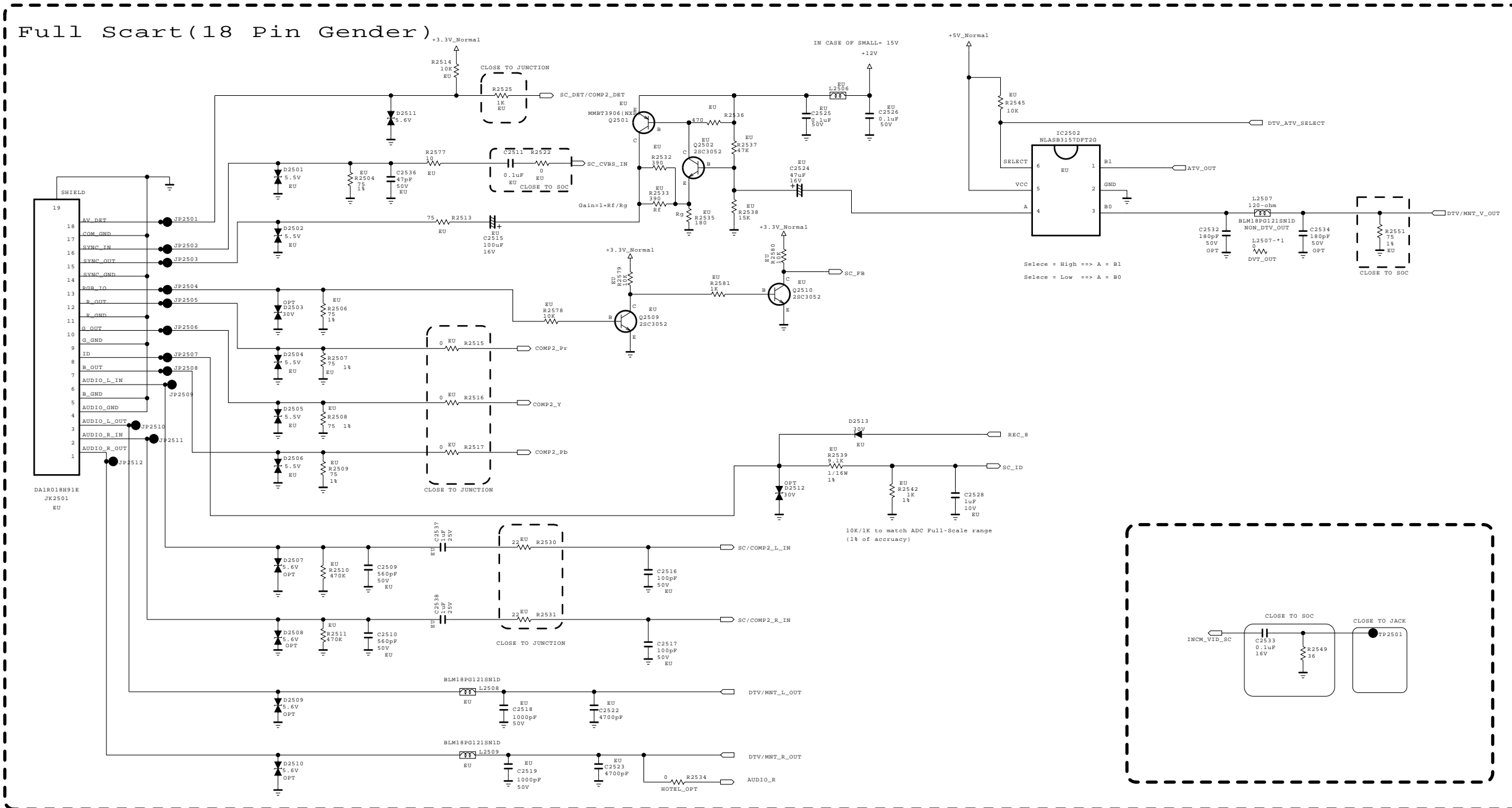
IN CASE OF SMALL+ 15V

+3.3V_Normal   +5V_Normal

CLOSE TO JUNCTION

SC_DET/COMP2_DET

DTV_ATV_SELECT

IC2502 NLAS8157DFT2G

ATV_OUT

MMBT3906(NX) Q2501

SC_CVBS_IN

CLOSE TO SOC

Gain=1+Rf/Rg

DTV/MNT_V_OUT

CLOSE TO SOC

Selece = High ==> A = B1
Selece = Low ==> A = B0

SHIELD

SC_FB

COMP2_Pr

COMP2_Y

COMP2_Pb

REC_8

SC_ID

10K/1K to match ADC Full-Scale range (1% of accuracy)

SC/COMP2_L_IN

SC/COMP2_R_IN

CLOSE TO JUNCTION

CLOSE TO SOC   CLOSE TO JACK

INCM_VID_SC

DTV/MNT_L_OUT

DTV/MNT_R_OUT

AUDIO_R

HOTEL_OPT

AUD_OUT >> EU/CHINA_HOTEL_OPT

IC2501 LM324D

DTV/MNT_L_OUT

SCART1_Lout_N

SCART1_Lout_P

SCART1_Rout_P

SCART1_Rout_N

DTV/MNT_R_OUT

CLOSE TO soc

[SCART AUDIO MUTE]

DTV/MNT_L_OUT
Q2503 2SC3052

DTV/MNT_R_OUT
Q2504 2SC3052

Q2505 RTIP141C-T112

SCART_MUTE

+3.5V_ST

[SCART PIN 8]

+12V

REC_8

SC_RE1

SC_RE2

Q2508 2SC3052

Q2507 2SC3052

Q2506 2SC3052

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	SCART	SHEET	25

NON CHB
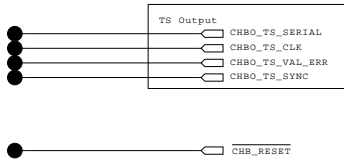
TS Output
CHB0_TS_SERIAL
CHB0_TS_CLK
CHB0_TS_VAL_ERR
CHB0_TS_SYNC

CHB_RESET

SECRET
LGElectronics

🄛 LG ELECTRONICS

MODEL	BCM35230	DATE		
BLOCK	NON CHB	SHEET	28	50

China Hotel Option

+24V_AMP

P2901
12505WS-09A00

CN_HOTEL

R2904 0
CN_HOTEL

C2901
0.1uF
CN_HOTEL

1

2

AUDIO_R

3

4

+3.3V_Normal

CN_HOTEL

R2902
10K
CN_HOTEL

AMP_RESET_N

R2903 0

5

AMP_MUTE_HOTEL

6

Q2901
MMBT3904(NXP)
CN_HOTEL

C

B

E

7

AMP_MUTE_HOTEL

R2901 200
CN_HOTEL

SPK_R+_HOTEL

8

SPK_R-_HOTEL

9

10

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	CHINA HOTEL	SHEET	29 /

3D_SYNC

L_VS

SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	NON URSA	SHEET	36 / 50

SMD GASKET

SMD GASKET 4.5T

M1 MDS62110208 GASKET_4.5T
M2 MDS62110208 GASKET_4.5T
M3 MDS62110208 GASKET_4.5T
M4 MDS62110208 GASKET_4.5T
M5 MDS62110208 GASKET_4.5T
M6 MDS62110208 GASKET_4.5T
M7 MDS62110208 GASKET_4.5T
M8 MDS62110208 GASKET_4.5T
M9 MDS62110208 GASKET_4.5T
M10 MDS62110208 GASKET_4.5T
M11 MDS62110208 GASKET_4.5T
M12 MDS62110208 GASKET_4.5T

SMD GASKET 5.0T

M1-*1 MDS62110210 GASKET_5.0T
M2-*1 MDS62110210 GASKET_5.0T
M3-*1 MDS62110210 GASKET_5.0T
M4-*1 MDS62110210 GASKET_5.0T
M5-*1 MDS62110210 GASKET_5.0T
M6-*1 MDS62110210 GASKET_5.0T
M7-*1 MDS62110210 GASKET_5.0T
M8-*1 MDS62110210 GASKET_5.0T
M9-*1 MDS62110210 GASKET_5.0T
M10-*1 MDS62110210 GASKET_5.0T
M11-*1 MDS62110210 GASKET_5.0T
M12-*1 MDS62110210 GASKET_5.0T

SMD GASKET 5.5T

M1-*2 MDS62110204 GASKET_5.5T
M2-*2 MDS62110204 GASKET_5.5T
M3-*2 MDS62110204 GASKET_5.5T
M4-*2 MDS62110204 GASKET_5.5T
M5-*2 MDS62110204 GASKET_5.5T
M6-*2 MDS62110204 GASKET_5.5T
M7-*2 MDS62110204 GASKET_5.5T
M8-*2 MDS62110204 GASKET_5.5T
M9-*2 MDS62110204 GASKET_5.5T
M10-*2 MDS62110204 GASKET_5.5T
M11-*2 MDS62110204 GASKET_5.5T
M12-*2 MDS62110204 GASKET_5.5T

SMD GASKET 6.5T

M1-*3 MDS62110206 GASKET_6.5T
M2-*3 MDS62110206 GASKET_6.5T
M3-*3 MDS62110206 GASKET_6.5T
M4-*3 MDS62110206 GASKET_6.5T
M5-*3 MDS62110206 GASKET_6.5T
M6-*3 MDS62110206 GASKET_6.5T
M7-*3 MDS62110206 GASKET_6.5T
M8-*3 MDS62110206 GASKET_6.5T
M9-*3 MDS62110206 GASKET_6.5T
M10-*3 MDS62110206 GASKET_6.5T
M11-*3 MDS62110206 GASKET_6.5T
M12-*3 MDS62110206 GASKET_6.5T

SMD GASKET 7.5T

M1-*4 MDS62110205 GASKET_7.5T
M2-*4 MDS62110205 GASKET_7.5T
M3-*4 MDS62110205 GASKET_7.5T
M4-*4 MDS62110205 GASKET_7.5T
M5-*4 MDS62110205 GASKET_7.5T
M6-*4 MDS62110205 GASKET_7.5T
M7-*4 MDS62110205 GASKET_7.5T
M8-*4 MDS62110205 GASKET_7.5T
M9-*4 MDS62110205 GASKET_7.5T
M10-*4 MDS62110205 GASKET_7.5T
M11-*4 MDS62110205 GASKET_7.5T
M12-*4 MDS62110205 GASKET_7.5T

SMD GASKET 8.5T

M1-*5 MDS62110209 GASKET_8.5T
M2-*5 MDS62110209 GASKET_8.5T
M3-*5 MDS62110209 GASKET_8.5T
M4-*5 MDS62110209 GASKET_8.5T
M5-*5 MDS62110209 GASKET_8.5T
M6-*5 MDS62110209 GASKET_8.5T
M7-*5 MDS62110209 GASKET_8.5T
M8-*5 MDS62110209 GASKET_8.5T
M9-*5 MDS62110209 GASKET_8.5T
M10-*5 MDS62110209 GASKET_8.5T
M11-*5 MDS62110209 GASKET_8.5T
M12-*5 MDS62110209 GASKET_8.5T

SMD GASKET 9.5T

M1-*6 MDS62110214 GASKET_9.5T
M2-*6 MDS62110214 GASKET_9.5T
M3-*6 MDS62110214 GASKET_9.5T
M4-*6 MDS62110214 GASKET_9.5T
M5-*6 MDS62110214 GASKET_9.5T
M6-*6 MDS62110214 GASKET_9.5T
M7-*6 MDS62110214 GASKET_9.5T
M8-*6 MDS62110214 GASKET_9.5T
M9-*6 MDS62110214 GASKET_9.5T
M10-*6 MDS62110214 GASKET_9.5T
M11-*6 MDS62110214 GASKET_9.5T
M12-*6 MDS62110214 GASKET_9.5T

M20 MDS62110214 GASKET3.5T_HEATSINK
M21 MDS62110213 GASKET3.5T_HEATSINK
M22 MDS62110213 GASKET3.5T_HEATSINK
M23 MDS62110213 GASKET3.5T_HEATSINK

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR
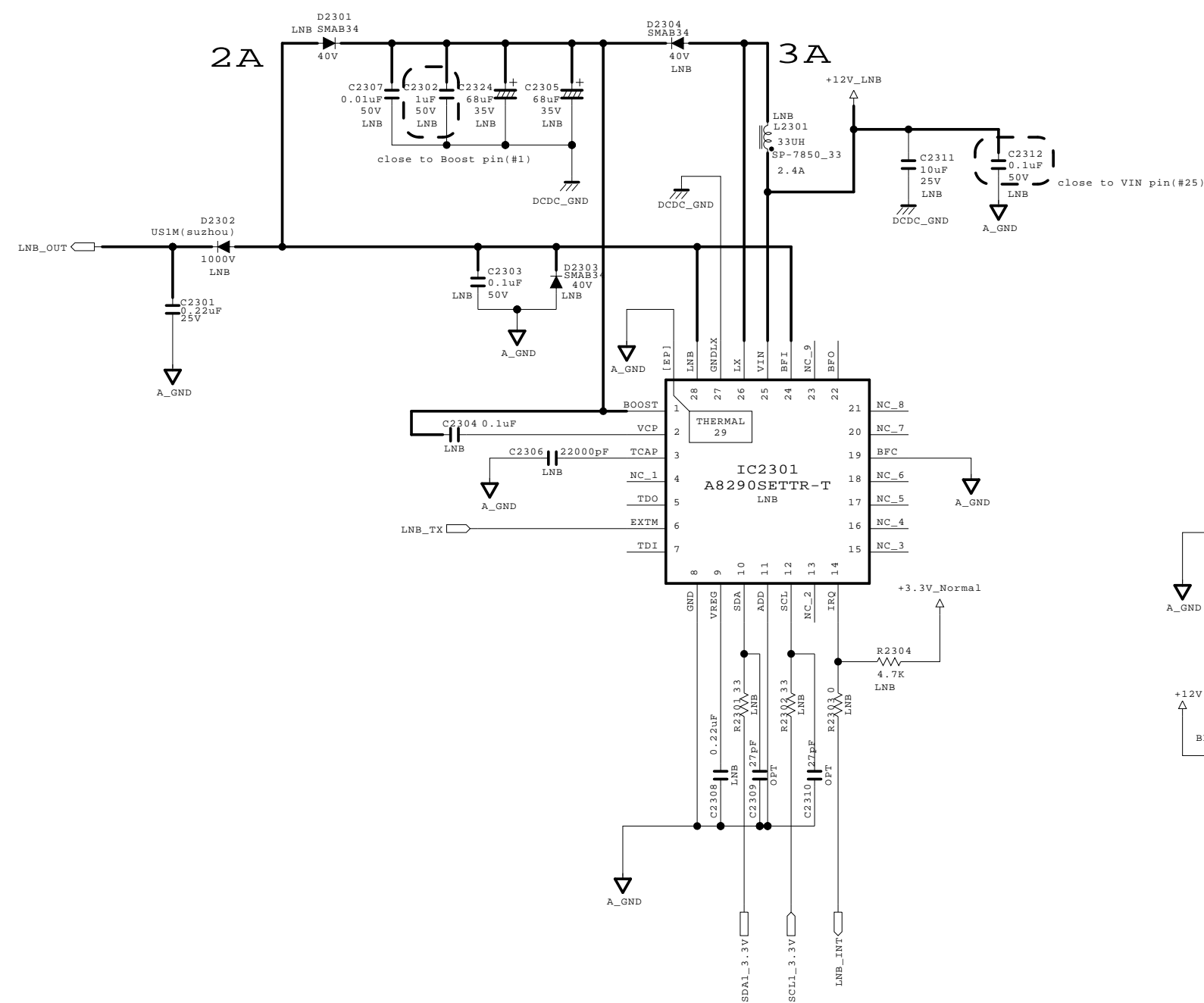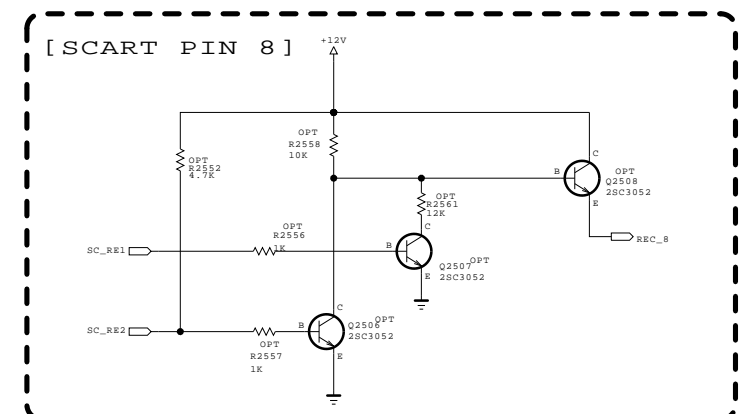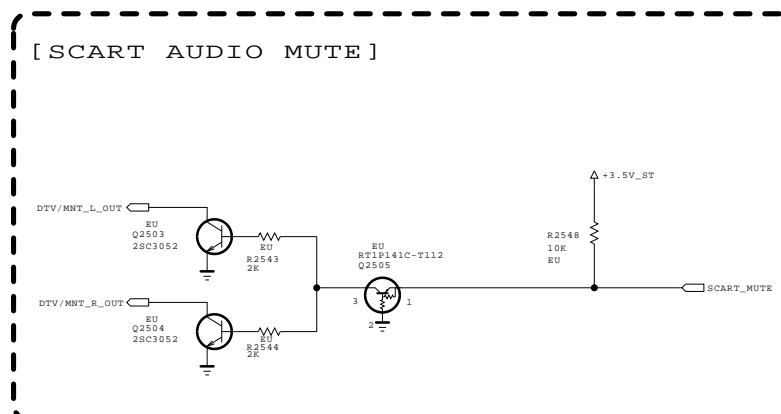THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | BCM35230 | DATE | 2010. 09. 18 |
| BLOCK | SMD GASKET | SHEET | 56 / 56 |

SMD GASKET (UNDER THE TUNER)
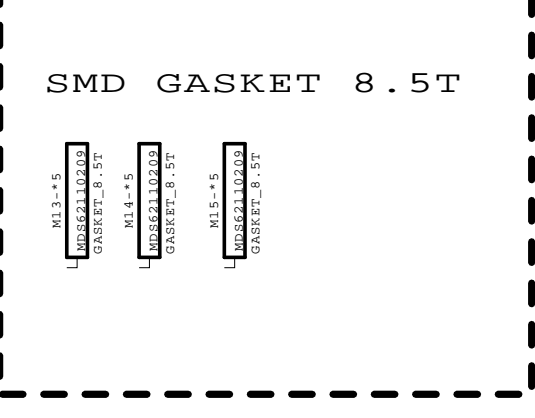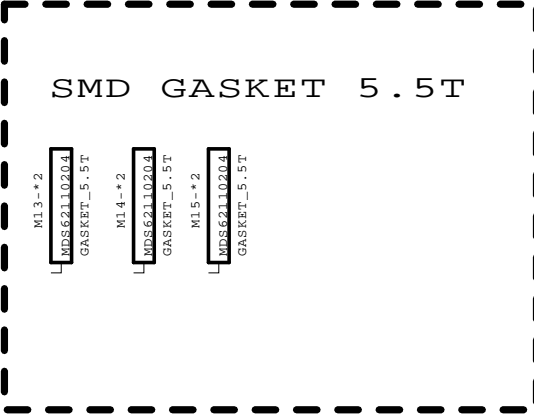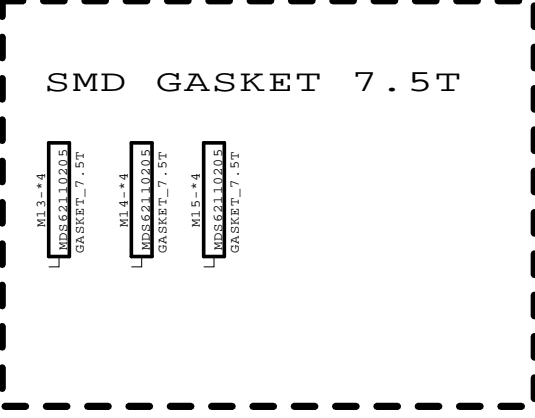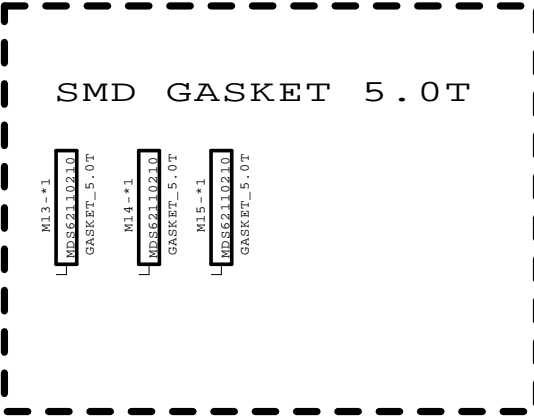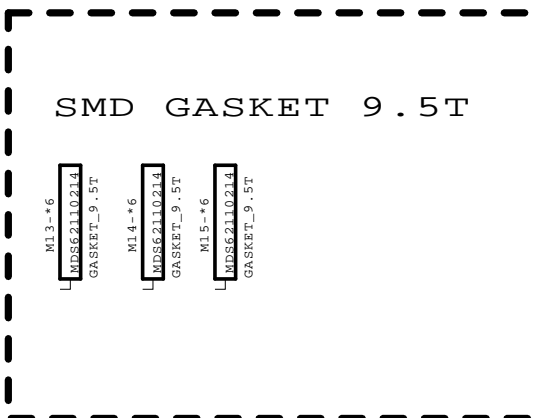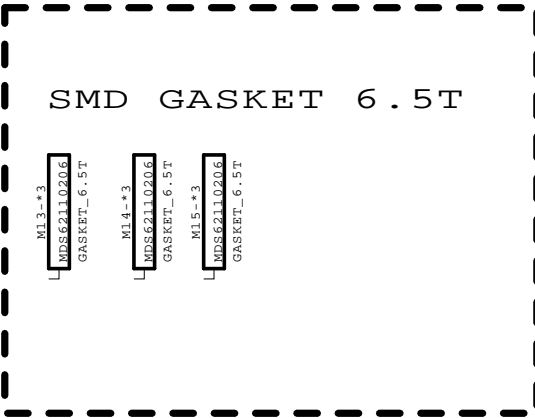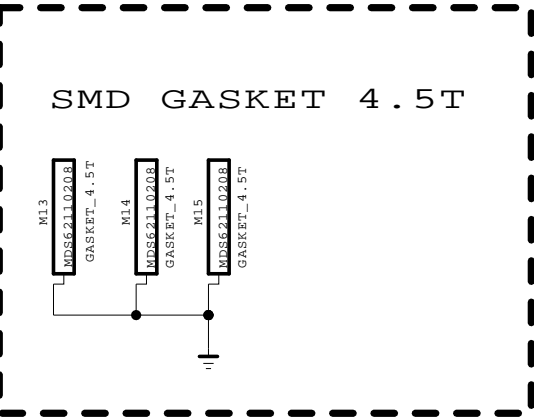
SMD GASKET 4.5T

SMD GASKET 6.5T

SMD GASKET 9.5T

SMD GASKET 5.0T

SMD GASKET 7.5T

SMD GASKET 5.5T

SMD GASKET 8.5T

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010. 09. 18
BLOCK	TUNER SMD GASKET	SHEET	57 / 57

FROM LIPS & POWER B/D

#16/#20/#23
LD - GND OR USE
LE(N.L.D.) - OPEN
LE(L.D.) - USE

DUAL COMPONENT

Q501,Q504, Q505,Q506	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q502	1ST : 0TRIH80004A, 2ND : EBK61012501, 3RD : 0TR102009AM
Q507	1ST : EBK60752501, 2ND : EBK61011501
IC502,IC503	1ST : EAN61151001, 2ND : EAN60670101

PANEL_POWER

TYP 1450mA

OS Module OPT

<OS MODULE PIN MAP>

PIN No	LGD	CMO(09)	AUO	SHARP
18	INV_ON	A-DIM	INV_ON	INV_ON
20	V4:VBR-A V5:NC	NC	Err_out	Err_out
22	PWM_DIM	PWM_DIM	A-DIM	PWM_DIM
24	Err_out LED:GND	INV_ON	PWM_DIM	GND

CHECK PWR/MODULE PIN MAP

Power_DET

PD_+20V → R510*4 S.6K 1%
PD_+18.5V → R510*3 4.7K 1%
PD_+20V → R511*4 1.3K 1%
PD_+18.5V → R511*3 1.21K 1%

15V-->3.6V
20V-->3.5V
24V-->3.48V
12V-->3.58V
ST_3.5V-->3.5V

not to RESET at 8kV ESD

+1.5V_DDR

Max 800mA

IC508
AP7173-SPG-13 HF(DIODES)
1.5A

$Vout = 0.8*(1+R1/R2)$

+0.9V_CORE_BCM35230

Max 7350 mA

IC501
TPS40192DRCR

$Vout = 0.591*(1+R1/R2)$ Switching freq: 600K

+3.3V_NORMAL

MAX 2.8A

IC505
TPS54425PWPR
4A

$Vout = 0.8*(1+R1/R2)$

+5V_Normal

MAX 1A

IC507
AOZ1073AIL-3
3A

$Vout = 0.8*(1+R1/R2)$

Switching freq: 500K

+2.5V_BCM35230

Max 960 mA

IC504
AP2132MP-2.5TRG1
2A

$Vout = 0.6*(1+R1/R2)$

+5V_USB+WIFI

MAX 1.9A

IC506
MP8706EN-C247-LF-Z
3A

$Vout = (1+R1/R2)*0.8$

$Vout = 0.8*(1+R1/R2)$

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	POWER	SHEET	5 / 58

LG Electronics Inc.

LCD TV Repair Guide

`11 years New Models

< Applicable Model >
XXLW980T/W/S/G-ZA
XXLW950T/W/S/G-ZA
XXLW770T/W/S/G-ZA
XXLW650W/S/G-ZC
XXLW570S/G
XXLW550T/W

T : UK T2/C
W : Nordic T2/C
S : Satellite
G : MHP

2 types of LED - ALEF

Benefit: More Clear More Real
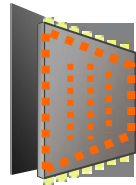
ALEF Type Local Dimming

LED Array is on the back of Module

BLU structure
- DBEF
- Prism sheets
- Diffuser plate
- Light Blocking Pattern
- Guiding Layer
- Reflecting coating w/patterns
- PCB
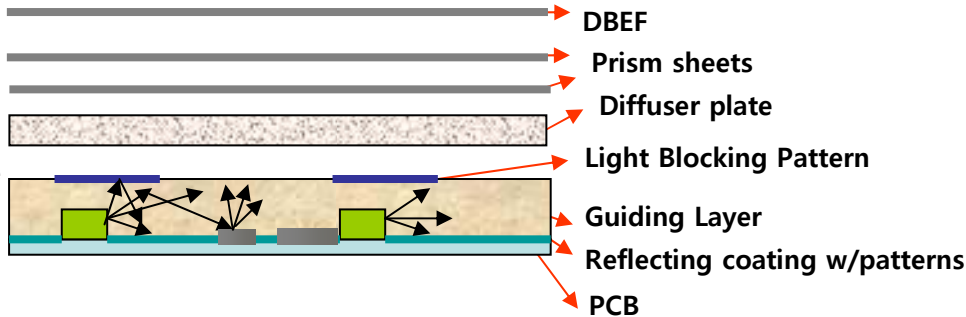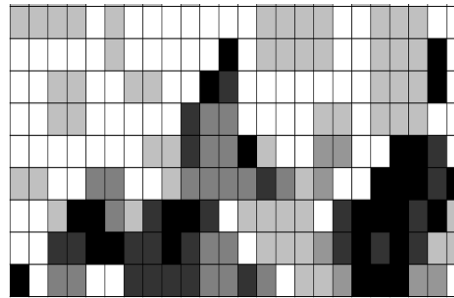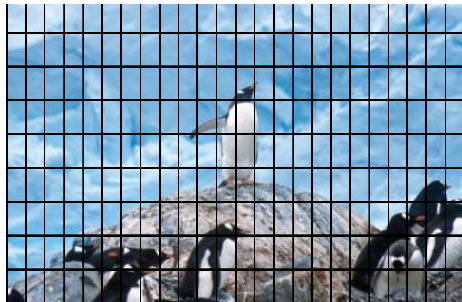
Local Dimming

Feature

ALEF LED	Best picture quality + thin TV Slimmer depth better picture quality
Local Dimming	Local dimming depicts more deep black.

Model

XXLW950T/W/S/G
47inch : H(24) * V(10) = 240Block
55inch : H(24) * V(12) = 288Block

XXLW770T/W/S/G
42inch : H(12) * V(4) = 48Block
47inch : H(12) * V(5) = 60Block
55inch : H(16) * V(6) = 96Block

XXLW980T/W/S/G
47inch : H(8) * V(9) = 72Block
55inch : H(8) * V(12) = 96Block

2 types of LED - Edge

LED | **Benefit: More Clear More Real**

LED
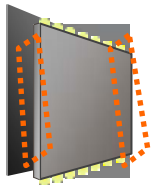
Edge Type
w/ Local Dimming
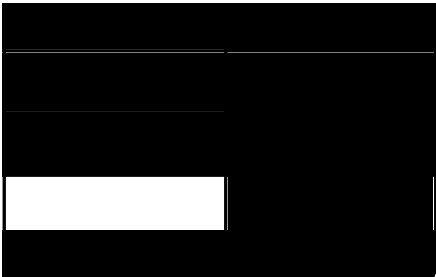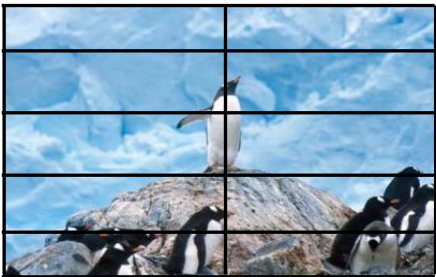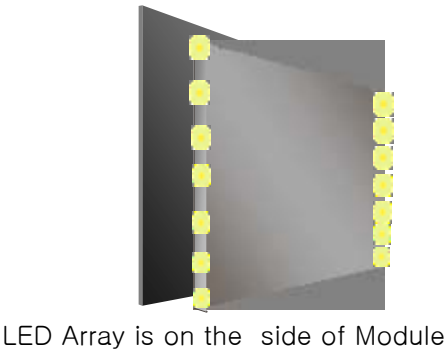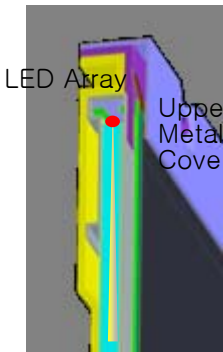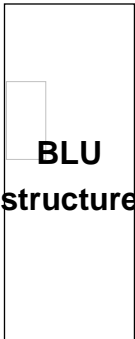
Feature

Edge LED	Best picture quality + thin TV
Local Dimming	Local dimming depicts more deep black.

BLU structure

LED Array

Upper Metal Cover

LED Array is on the side of Module

Local Dimming

Model

XXLV5500/T/W/G-ZA
XXLV570G/S-ZA
XXLW550T/W/S-ZA
XXLW650W/G/S-ZA
XXLW570G/S-ZA

32inch : H(2) * V(5) = 10Block
37inch : H(2) * V(5) = 10Block
42inch : H(2) * V(8) = 16Block
47inch : H(2) * V(8) = 16Block
55inch : H(2) * V(8) = 16Block

Main PCB for Smart TV

XXLW980T/W/G/S-ZA
XXLW950T/W/G/S-ZA
XXLW770T/W/G/S-ZA
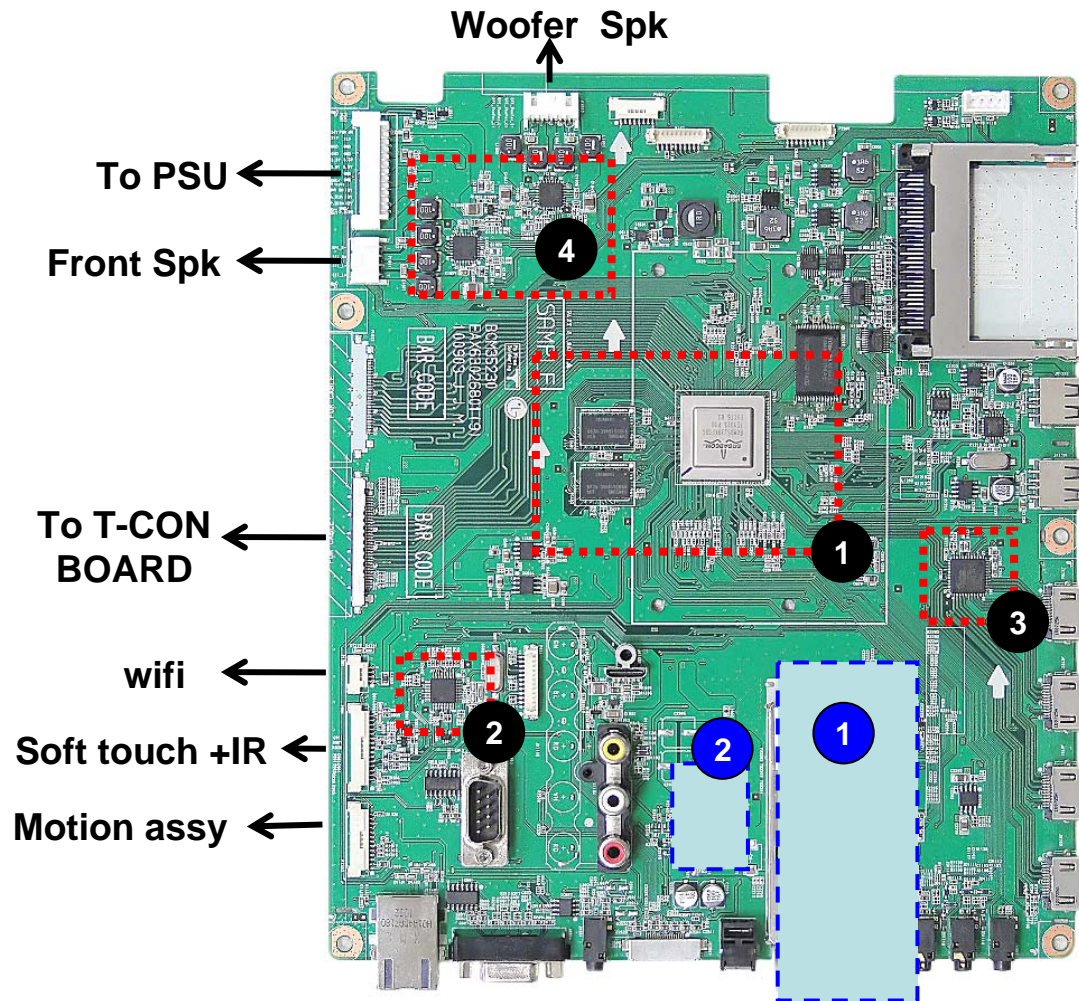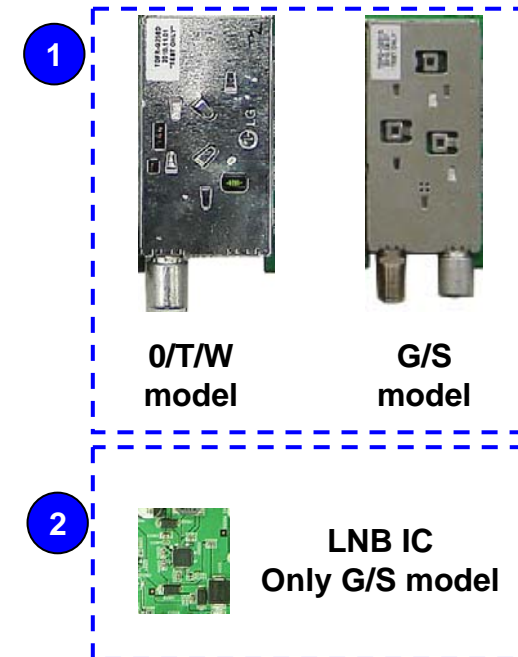
Woofer Spk

To PSU ←

Front Spk ←

4

To T-CON
BOARD ←

1

wifi ←

Soft touch +IR ←

2

Motion assy ←

2   **1**

0/T/W
model

G/S
model

2   LNB IC
Only G/S model

1   Main processor, DDR Memory
Flash Memory

3

2   Micom for Key/IR sensing

3   HDMI switch (4:1)

4   Audio AMP (10W+10W)

Tuner type can be changed by the model name.

Main PCB for Broadband

XXLW5500/T/W/S-ZA
XXLW650W/G/S-ZA
XXLW570G/S-ZA

0/T/W model   **G/S model**

LNB IC
Only G/S model

To PSU ←

Front Spk ←

To T-CON BOARD ←

Soft touch +IR ←

BAR CODE
BAR CODE

1	Main processor, DDR Memory Flash Memory
2	Micom for Key/IR sensing
3	HDMI switch (4:1)
4	Audio AMP (10W+10W)
5	URSA5 External FRC

Main PCB for Broadband

XXLV5500/T/W/G-ZA
XXLV570G/S-ZA

1

0/T/W model name

G/S model name

2

LNB IC
Only G/S model

To PSU ←

Front Spk ←

To T-CON BOARD ←

←

Soft touch +IR ←

4

1

2

2

1

3

1 Main processor, DDR Memory Flash Memory

2 Micom for Key/IR sensing

3 HDMI switch (4:1)

4 Audio AMP (10W+10W)

3DTV System

❖ Passive Type (LW98)

RF
Component
RGB
USB

DTV Main board

DTV SoC

FRC Sub board

FRC
2D to 3D

URSA5 x 2

LG5811
(XTR T-con)

LCD 240Hz Panel

BD Player

HDMI 1.3/
HDMI 1.4

Mini
LVDS

GP3 Backend block diagram (LW98 PG)

51Pin LVDS Input

VLCD_POWER
DC-DC Converter (AOZ1073AI) → 1.26V_URSA5

VLCD_POWER (+12V)

FRC_RESET
I2C_SCL
I2C_SDA

VLCD_POWER
DC-DC Converter (AOZ1073AI) → +3.3V_URSA5

Dual-link LVDS(@74.25MHz)

M/SPIF

I2C_SDA
I2C_SCL

Xin/Xout
XTAL_IN
XTAL_OUT
X-Tal (24Mhz)

SPI FLASH (4Mbit)
SPI_DI
SPI_DO/CK/CS

URSA5 (0xB4, master)

DDR3 SDRAM
- 1Gbit (x16)
- 800Mbps
DDR1_A[12:0]/BA[2:0]/CLK/CKE
DDR1_DATA[15:0]

URSA5 (0xB8, slave)

I2C_S
I2C_SCL_M
I2C_SDA_M

DDR3 SDRAM
- 1Gbit (x16)
- 800Mbps
DDR0_A[12:0]/BA[2:0]/CLK/CKE
DDR0_DATA[15:0]

GPIO/XOUT
XIN

I2C_M
I2C_SCL_M
I2C_SDA_M

Quad-link LVDS

Quad-link LVDS

+3.3_URSA5
DC-DC Converter (AOZ1072AI) → +1.5V_DDR

I2C_SCL
I2C_SDA

XTR T-Con (0x72)

I2C_TCON_SCL
I2C_TCON_SDA
EEPROM (64kbit)

VLCD_POWER
I2C_SC
I2C_SDA
PMIC (MAX17139) (0x42) → VCC_LCM/VDD_LCM/VGH/VGL/HVDD/VCORE

Dual-link HF mini-LVDS (@297MHz)

Dual-link HF mini-LVDS (@297MHz)

VCC_LCM/VDD_LCM/HVDD
I2C_SC
I2C_SDA
P-GAMMA IC (BUF08630) (0xE8) → GMA[18:15], GMA[9:5]
P_VCOM

VCC_LCM/VDD_LCM/HVDD
I2C_SC
I2C_SDA
P-GAMMA IC (BUF08630) (0xEA) → GMA[14:10], GMA[4:1]

Z_OUT

RIGHT

LEFT

BCM35230 Block Diagram (SG LW95/77, LV55/57))

BCM35230 Block Diagram (LW98)

Air/Cable → TUNER (T/C) → ANALOG DEMOD / DIGITAL DEMOD (T/C)

DVB-S → TUNER (S2) → DIGITAL DEMOD (S2)

LNB

CI slot

NAND Flash(8Gb)

SYSTEM DDR3 X 16 X 2 (2Gb)

SYSTEM EEPROM X 1 (1Mb)

P_TS   P_TS
DIF(+/-)
CVBS(M)

DVB-T/C Demod
CVBS
TS_S/P

USB hub (only LW950X)

DVR ready
USB1
USB2
USB HUB IC

WiFi (built in)
Only LW950X

USB

Side

HDMI1
HDMI2
HDMI3
HDMI4
HDMI HUB IC

HDMI S/W
(HDCP EEPROM)

LVDS.

51P → T-con (URSA5 x 2) → Mini LVDS

I2S Out

Audio AMP

Audio AMP (Woofer)
Only LW950X/770X

BCM 35230

H/P → L/R Out
A/V2 → CVBS
COMP1 → COMP
SCART → RGB In/CVBS In Out → CVBS

Bottom side

PC-RGB → RGB,H/V
PC-AUDIO → L/R In
OPTIC → SPDIF OUT
LAN → Ethernet

I2C → Sub Micom (sanyo)

I2C → Wireless Ready

UART → M-Remote Module (built in)
Only LW950X/770X

A/V1
RS-232C

Rear

BCM35230 Block Diagram (PG))

Air/Cable
DVB-S

TUNER (T/C)
ANALOG DEMOD
DIGITAL DEMOD (T/C)
TUNER (S2)
DIGITAL DEMOD (S2)
LNB

CAM, DVR Ready

CI slot
P_TS
P_TS
DIF(+/-)
CVBS(M)

NAND Flash(8Gb)
SYSTEM DDR3 X 16 X 2 (2Gb)
SYSTEM EEPROM X 1 (1Mb)

DVB-T/C Demod
CVBS
TS_S/P

USB1
USB2

Side

HDMI1
HDMI2
HDMI3
HDMI4

HDMI HUB IC

USB

HDMI S/W
(HDCP EEPROM)

LVDS.
LG7303A
51P
41P

I2S Out
Audio AMP
Audio AMP

BCM 35230

H/P
A/V1
COMP1
SCART
RGB In/CVBS In Out
PC-RGB
Rear
PC-AUDIO
OPTIC
LAN
RS-232C

L/R Out
CVBS
COMP
CVBS
RGB,H/V
L/R In
SPDIF OUT
Ethernet
UART

I2C
Sub Micom (NEC)
I2C
Wireless Ready

Jack Interface

Appendix. Block Diagram for Edge/ALEF Backlight

[All in one main PCB for XXLW950T/W/S/G,XXLW770T/W/S/G ALEF LED Backlight]

Main SoC (BCM)

FHD@60Hz
Dual-Link LVDS
2

3D_Sync

2D-3D (LGSIC)

FHD@60Hz
Dual-Link LVDS
2

FRC-II (LG1121)

FHD@240Hz
Octa-Link LVDS
4

XTR T-Con (LGSIC)

FHD@240Hz
Quad-Link
HF mini-LVDS
8

SPI/Vsync

LED BLU control

Vsync

RF Emitter

Active Type Display

RF comm
- Vsync
- Format info
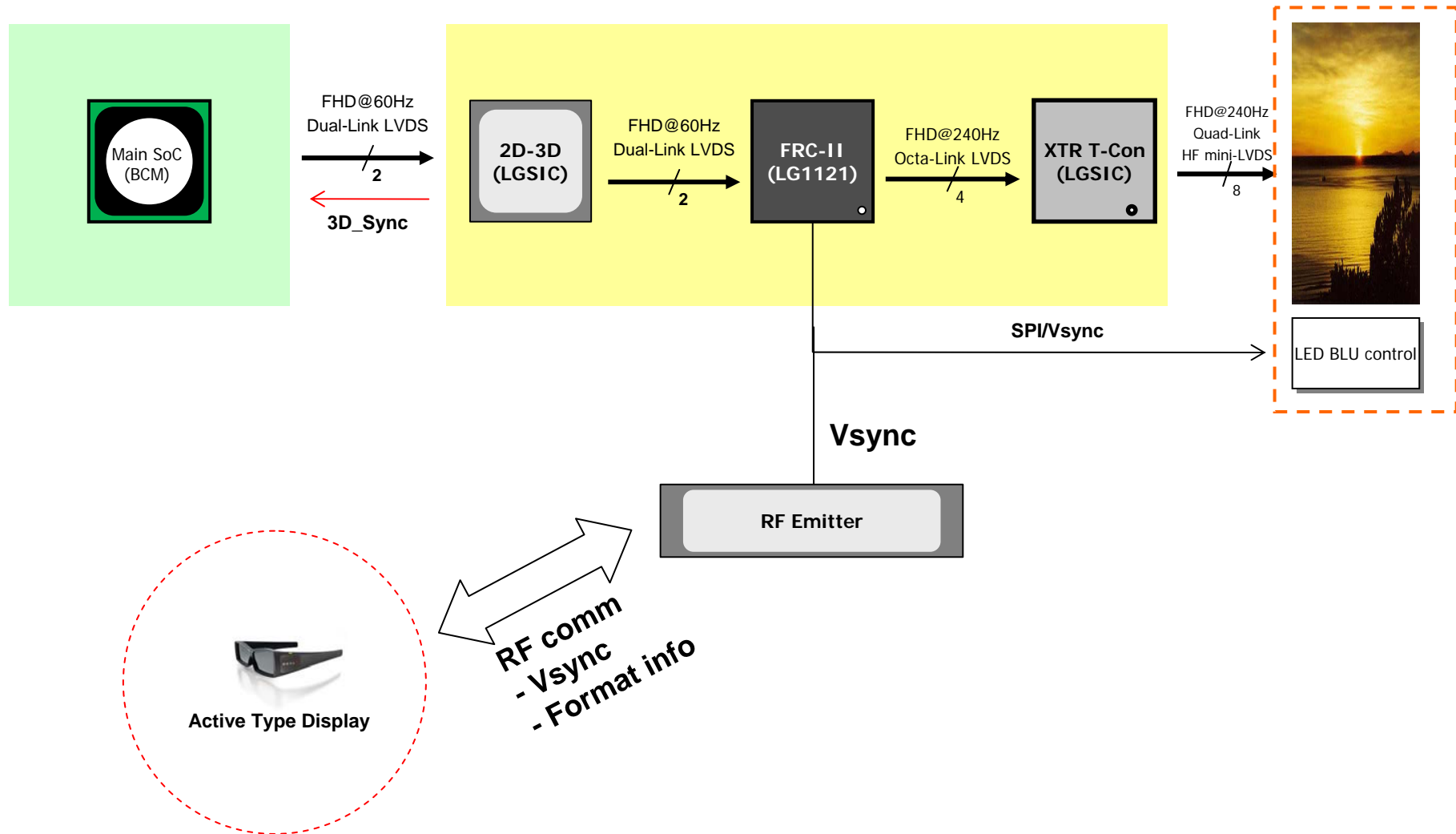
* For more information about 3D system, refer to the page 1 ~6

Appendix. Block Diagram for ALEF Backlight

[All in one main PCB for **XXLW980T/W/S/G** ALEF LED Backlight]

Main SoC
(BCM)

FHD@60Hz
Dual-Link LVDS

2

URSA5
(LG1121)

URSA5
(LG1121)

FHD@240Hz
Octa-Link LVDS

4

4

XTR T-Con
(LGSIC)

FHD@240Hz
Quad-Link
HF mini-LVDS

8

SPI/Vsync

LED BLU control
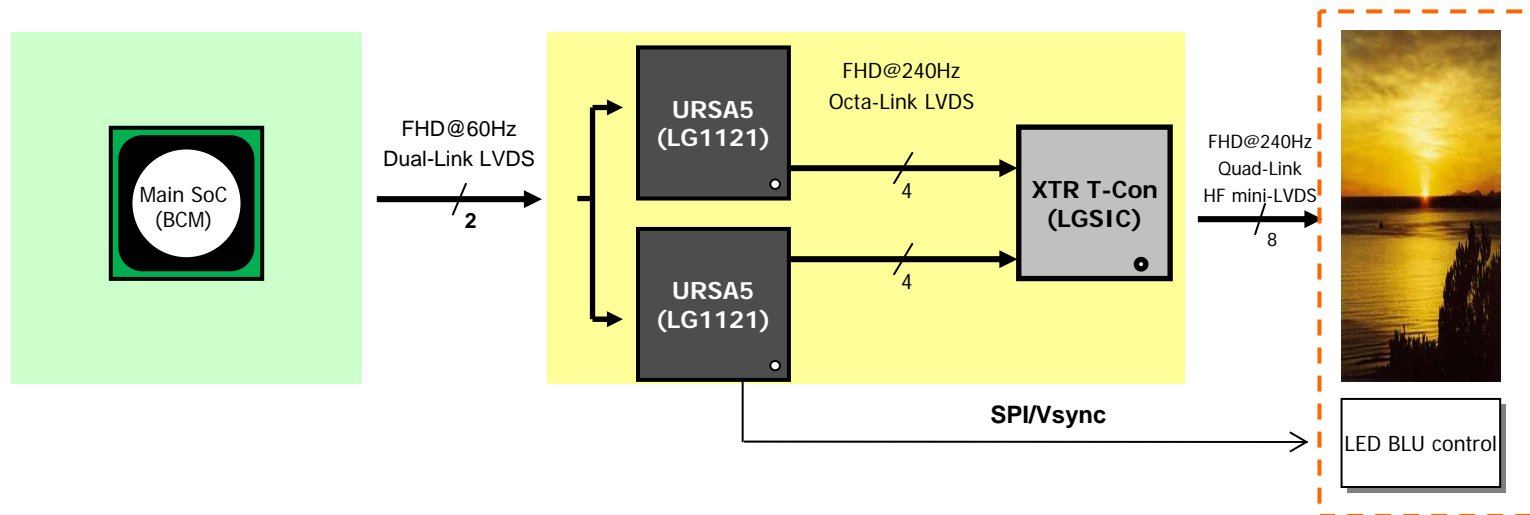
* For more information about 3D system, refer to the page 1 ~6

Interconnection - 1

XXLW950T/W/S/G-ZA
XXLW980T/W/S/G-ZA
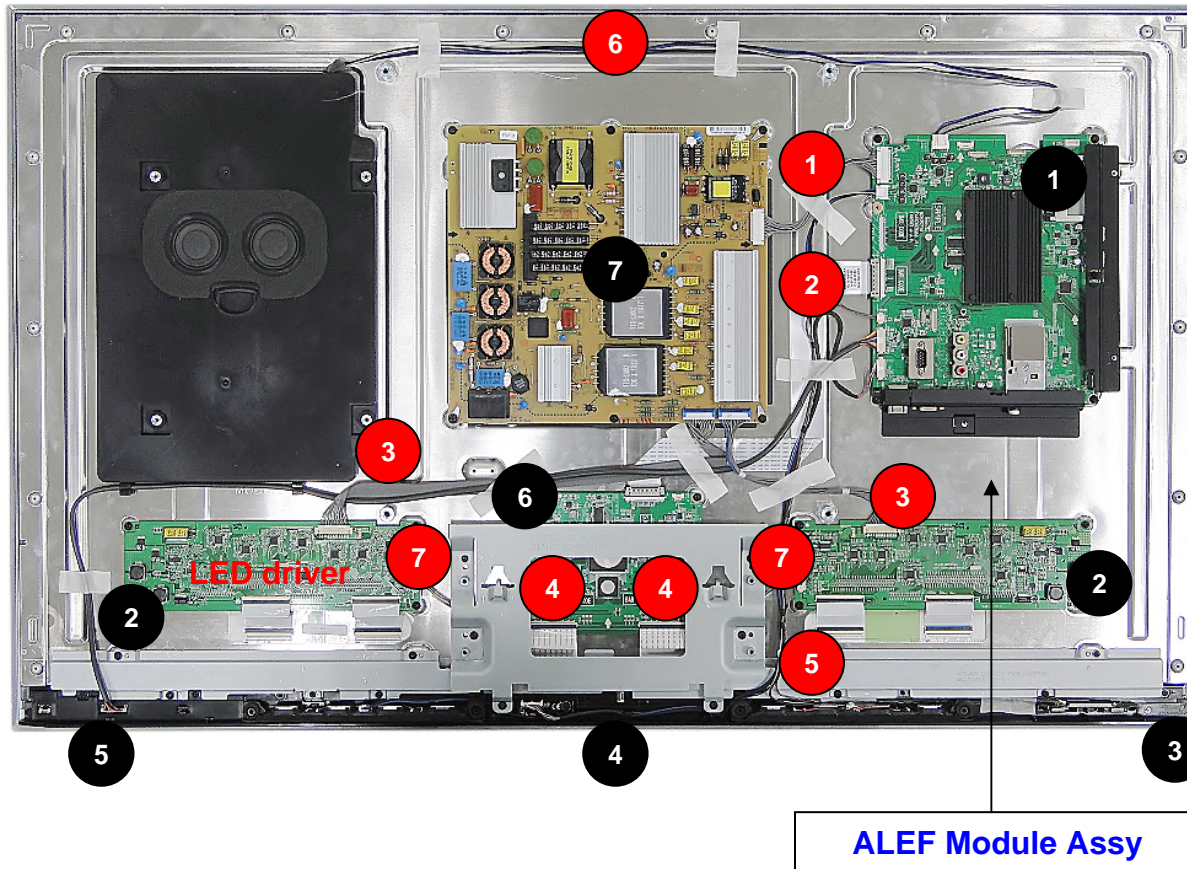
[PCBs]

1. Main PCB
2. LED driver
3. WIFI ASSY
4. RF MOTION ASSY
5. Soft Touch + IR Key PCB
6. T-CON ASSY
7. PSU

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable 51PIN
3. LED driver / PSU
4. T-CON to Module 80pin FFC
5. Multi-cable: IR+MOTION+WIFI +SPK
6. WOOFER SPK CABLE
7. Local dimming cable 8pin

LED driver

ALEF Module Assy

Interconnection - 2

XXLW770T/W/S/G-ZA
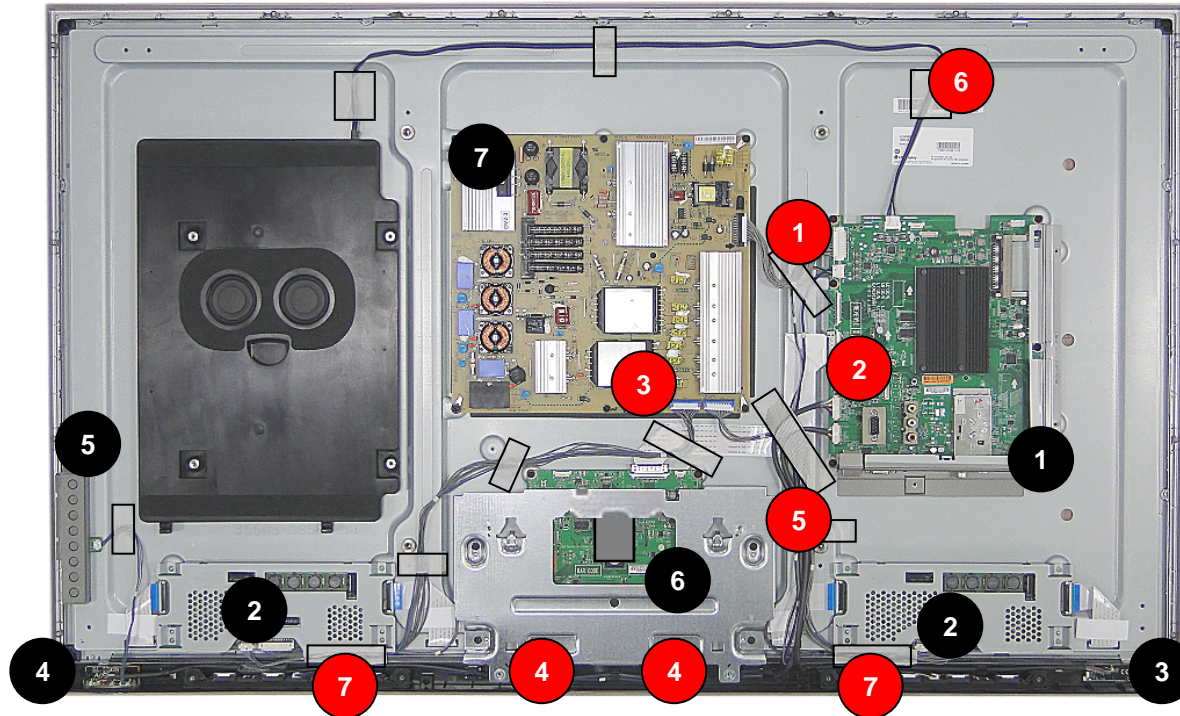
[PCBs]

1 Main PCB

2 LED driver

3 RF MOTION ASSY

4 IR Key PCB

5 Control key

6 T-CON ASSY

7 PSU

[Cables]

1 Main / PSU cable

2 Main / Module LVDS cable 51PIN

3 LED driver / PSU

4 T-CON to Module 80pin FFC

5 Multi-cable:
IR+MOTION +SPK

6 WOOFER SPK CABLE

7 Local dimming cable 8pin

Interconnection – sub PCB(LW950/LW980 Series)

5 Soft Touch + IR Key PCB
(15pin)

4 RF MOTION ASSY
(12pin)

SPK unit

3 WIFI ASSY
(4pin)

Soft Touch
IR Key PCB

(15pin)

RF MOTION ASSY

(12pin)

WIFI ASSY

(4pin)

1

To Main

Interconnection – sub PCB(LW770 Series)

4 IR Key PCB
(15pin)

3 RF MOTION ASSY
(12pin)

SPK unit

Control key

IR Key PCB

(4pin)

(15pin)

RF MOTION ASSY

(12pin)
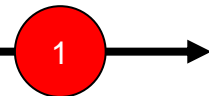
1 To Main

Appendix. Block Diagram for Edge Backlight

FHD@120Hz
QuadI-Link

Main SoC
(BCM)

FHD@60Hz
Dual-LVDS

URSA5
(MST7303)

FHD@240Hz
Octa-Link LVDS

SPI/Vsync

Vsync

BackLight
Scanning

FHD@240Hz
QuadI-Link
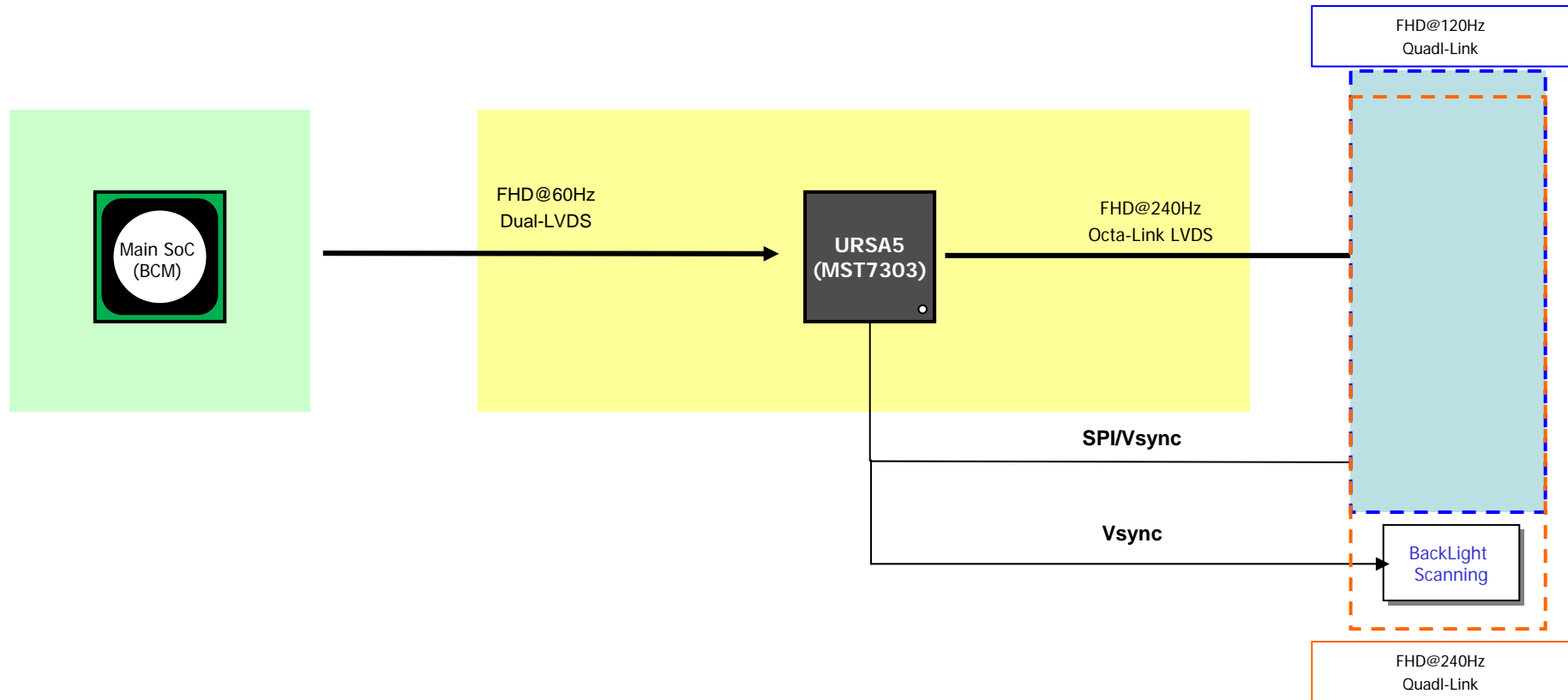
[All in one main PCB for XXLW650W/S/G 240Hz & XXLW550T/W/S,XXLW570G/S 120Hz]

Interconnection - 1

XXLW550T/W/S-ZA
XXLW650W/G/S-ZA
XXLW570G/S-ZA

T-con Driver
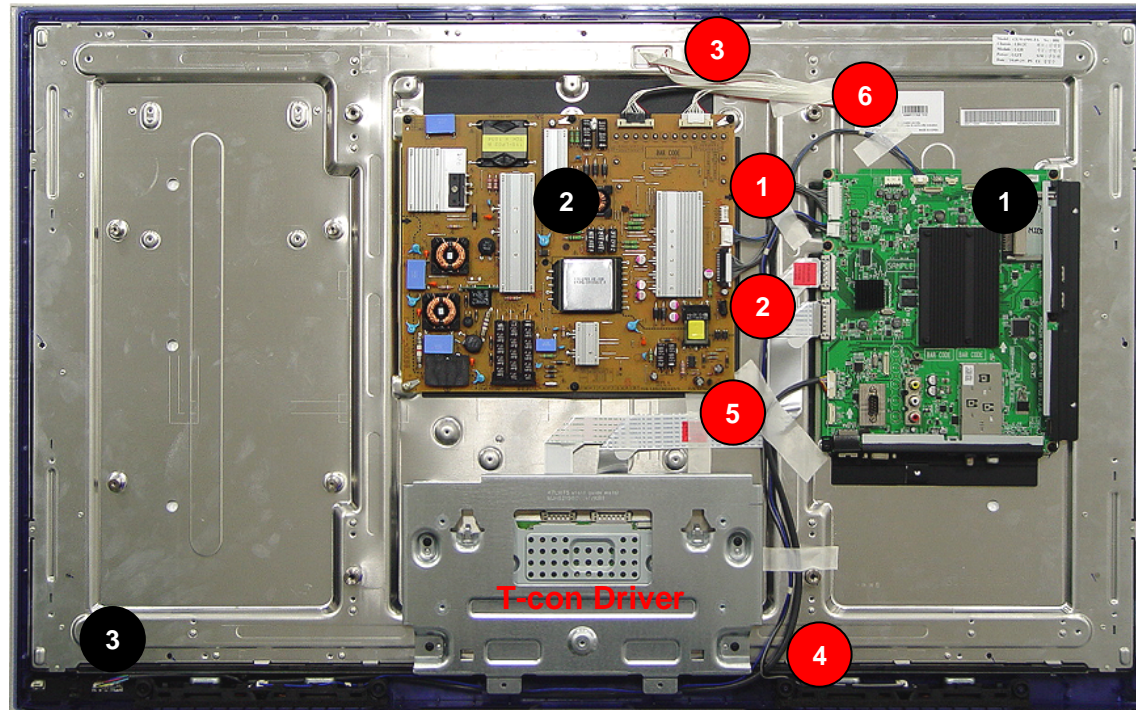
[PCBs]

1. Main PCB
2. Power Board
3. Soft touch + IR Key PCB

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable 41&51PIN
3. LED driver / PSU
4. 15Pin (IR+Touch) Cable
5. SPK Cable
6. Local Dimming Cable

32/37LV5500/T/W/G-ZA
32/37LV570G/S-ZA
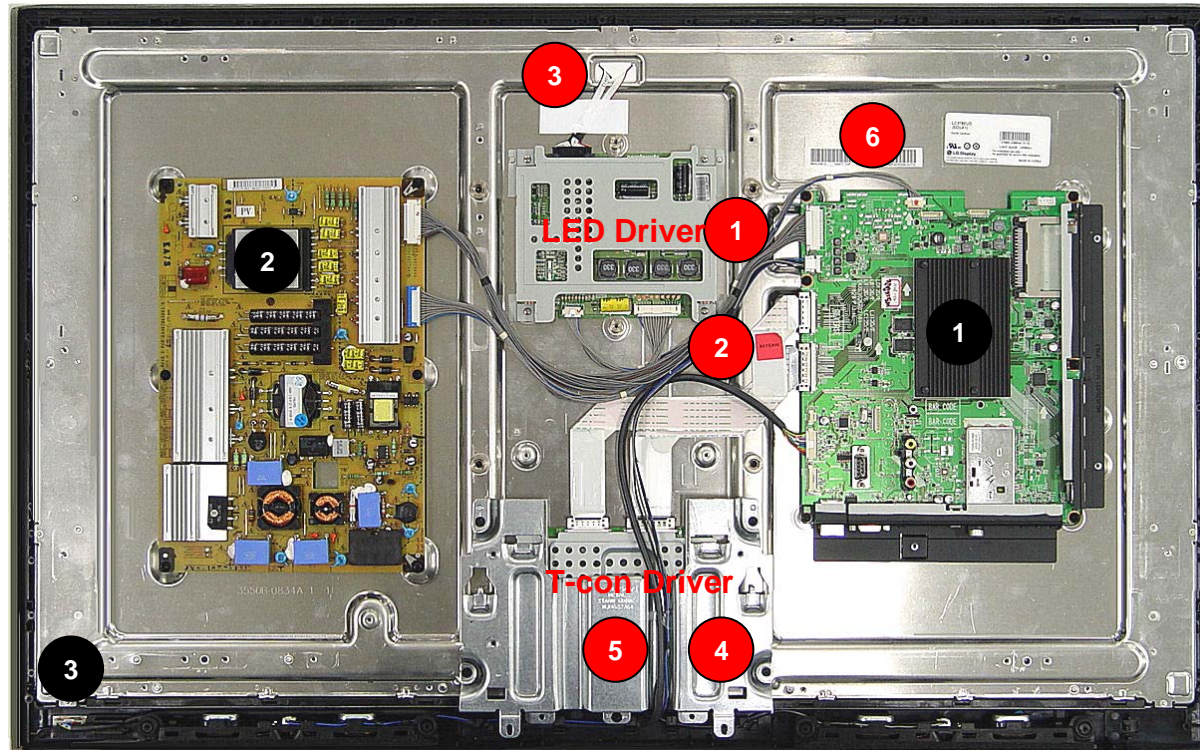
[PCBs]

1 Main PCB

2 Power Board

3 Soft touch + IR Key PCB
(LW570 only IR Assy)

[Cables]

1 Main / PSU cable

2 Main / Module LVDS cable
41&51PIN

3 LED driver / PSU

4 15Pin (IR+Touch) Cable

5 SPK Cable

6 Local Dimming Cable

42/47LV5500/T/W/G-ZA
42/47LV570G/S-ZA

Same interconnection LW or LV serise in the 42"/47"
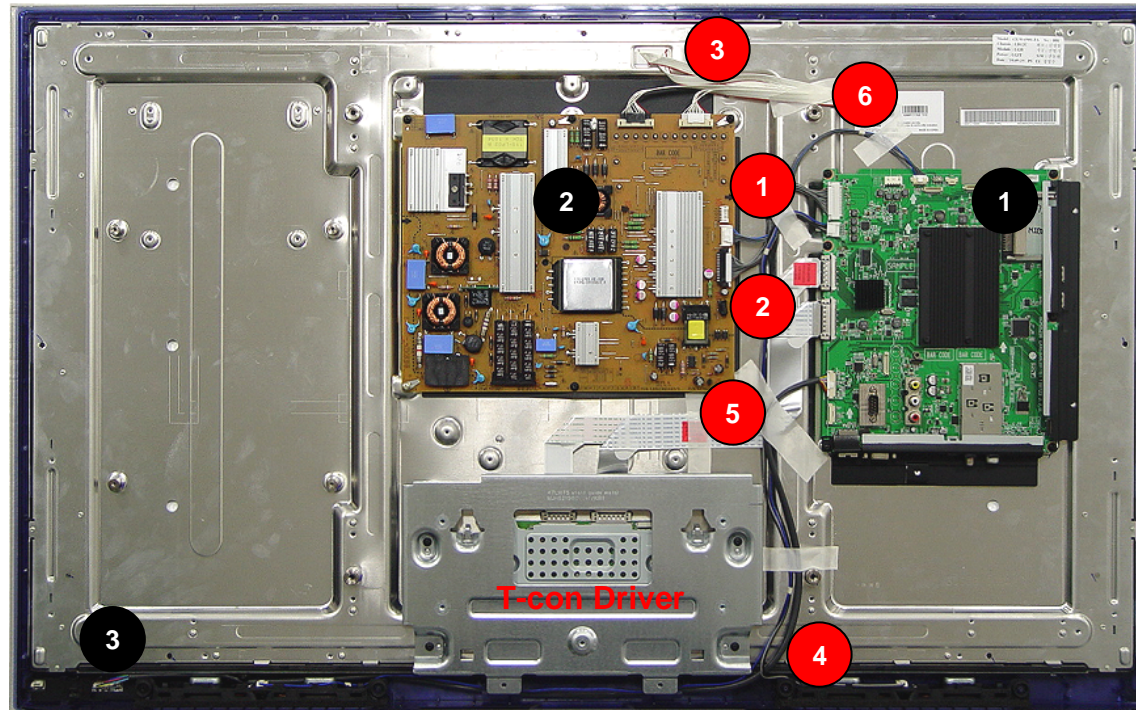
[PCBs]

1 Main PCB

2 Power Board

3 Soft touch + IR Key PCB (LV570 only IR Assy)

[Cables]

1 Main / PSU cable

2 Main / Module LVDS cable 41&51PIN

3 LED driver / PSU

4 15Pin (IR+Touch) Cable

5 SPK Cable

6 Local Dimming Cable

Interconnection – sub PCB(LV/LW55/57/65 serise)
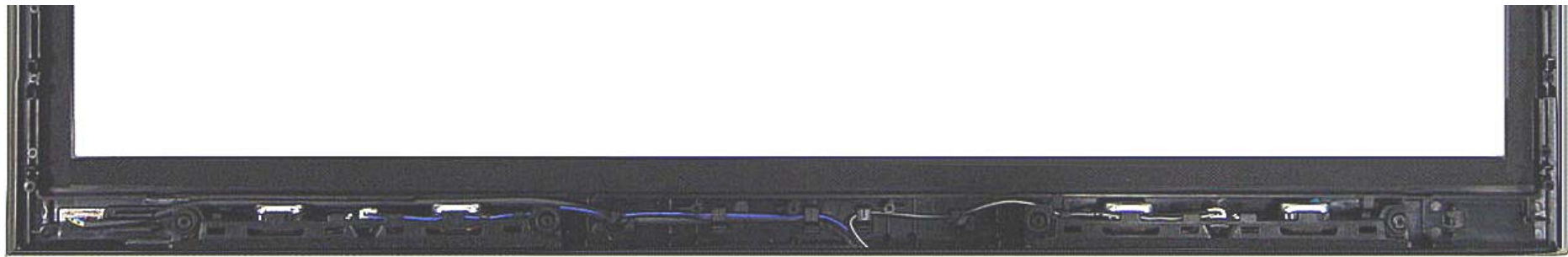
3

**IR & Soft touch Key PCB
(LV/LW570 only IR Assy)**

SPK unit

**Control key
(LV/LW570)**

**IR & Soft touch
Key PCB
(LV/LW570
only IR Assy)**

4

To Main

Contents of LCD TV Standard Repair Process

No.	Error symptom (High category)	Error symptom (Mid category)	Page	Remarks
1	A. Video error	No video/Normal audio	1	
2		No video/No audio	2	
3		Video error, video lag/stop, fail tunning	3, 4	
4		Color error	5	
5		Vertical/Horizontal bar, residual image, light spot, external device color error	6	
6	B. Power error	No power	7	
7		Off when on, off while viewing, power auto on/off	8	
8	C. Audio error	No audio/Normal video	9	
9		Wrecked audio/discontinuation/noise	10	
10	D. Function error	No response in remote controller, key error, recording error, memory error	11	
11		External device recognition error	12	
12	E. Noise	Circuit noise, mechanical noise	13	
13	F. Exterior error	Exterior defect	14	

First of all, Check whether there is SVC Bulletin in GCSC System for these model.

LCD TV	**Error symptom**	**A. Video error**	**Established date**	**2010. 12 .14**	
		No video/ Normal audio	**Revised date**		**1/14**

First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, LVDS Cable,Speaker Cable,IR B/D Cable,,,)

☞A1   ☞A4

No video
Normal audio → Normal audio —Y→ **Check Back Light On with naked eye** → On —Y→ **Check Power Board 12v,3.5v etc.** → Normal voltage —Y→ **Replace T-con Board or module And Adjust VCOM**

Normal audio —N→ Move to No video/No audio

On —N→ ☞A2 **Check Power Board 24v output**

Normal voltage —N→ Repair Power Board or parts   ☞A28

Check Power Board 24v output → Normal voltage —Y→ Replace Inverter or module → End

Normal voltage —N→ Repair Power Board or parts → End

※Precaution ☞A7 & A3

Always check & record S/W Version and White Balance value before replacing the Main Board → Replace Main Board → Re-enter White Balance value

1

Standard Repair Process					
LCD TV	**Error symptom**	**A. Video error**	**Established date**	**2010. 12 .14**	
		No video/ No audio	**Revised date**		**2/14**

☞**A4**

No Video/ No audio → Check various voltages of Power Board (3.5V,12V,20V or 24V…) → **Normal voltage?**

— Y → Check and replace MAIN B/D → **End**

— N → Replace Power Board and repair parts → **End**

2

Standard Repair Process					
LCD TV	**Error symptom**	**A. Picture Problem**		**Established date**	**2010. 12 .14**	
		Picture broken/ Freezing		**Revised date**		**3/14**

☞ **A6**

Check RF Signal level

. By using Digital signal level meter
. By using Diagnostics menu on OSD
   (Menu→ Set up→ Support → Signal Test)
   - Signal strength (Normal : over 50%)
   - Signal Quality (Normal: over 50%)

Normal Signal? — Y → **Check whether other equipments have problem or not. (By connecting RF Cable at other equipment) → DVD Player ,Set-Top-Box, Different maker TV etc`**

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture? — N → **Contact with signal distributor or broadcaster (Cable or Air)**

Y

Close

Normal Picture? — Y → ☞ **A7** **Check S/W Version**

N

Contact with signal distributor or broadcaster (Cable or Air)

SVC Bulletin? — Y → **S/W Upgrade**

N

S/W Upgrade → **Normal Picture?** — N →

Y

Close

■ Menu→Setup →Booster

Booster menu
On→Off: Check
Off→On: Check

Normal Picture? — Y → **Close**

N

Check Tuner soldering

Replace Main B/D

3

LCD TV	Error symptom	A. Picture Problem (DVB-S/S2)	Established date	2011. 01 .24	
		Tuning fail, Picture broken/ Freezing	Revised date		4/14

☞ **A6**

Check RF Signal level

Check RF signal cable (DVB satellite signal or not)
Check whether other equipments have problem or not.
(By connecting RF Cable at other equipment)
  → Set-Top-Box, Different maker TV etc

Normal Signal?

Y

Check satellite setting.
- Check LNB frequency.
- Check satellite
- Check Satellite connection (DiSEqC, motor, etc…)

Normal setting?

Y

☞ **A7**

Check S/W Version

SVC Bulletin?

N

Check Tuner soldering

Replace Main B/D

N

Contact with signal distributor or broadcaster (Cable or Air)

N

Change satellite setting (match with installed ANT)

Y

S/W Upgrade

N

Normal Picture?

Y

Close

Close

N

Normal Picture?

Y

Close

Y

Close

4

Standard Repair Process					
LCD TV	**Error symptom**	**A. Video error**	**Established date**	**2010. 12 .14**	
		Color error	**Revised date**		**5/14**

☞**A8**

Check color by input
-External Input
-COMPONENT
-RGB
-HDMI/DVI

Color error? Y → ☞ **A10/ A11**

※ **Check and replace Link Cable (LVDS) and contact condition**

Color error? Y → Replace Main B/D → **Color error?** Y → Replace module

N → End

N

N → Check error color input mode

☞**A12**

Check Test pattern

External Input/ Component error → Check external device and cable → **External device /Cable normal** Y → Replace Main B/D

N → **Request repair for external device/cable**

RGB/ HDMI/DVI error → Check external device and cable → **External device /Cable normal** Y → Replace Main B/D

N

5

Standard Repair Process					
LCD TV	**Error symptom**	**A. Video error**	**Established date**	**2010. 12 .14**	
		Vertical / Horizontal bar, residual image, light spot, external device color error	**Revised date**		**6/14**

Vertical/Horizontal bar, residual image, light spot

☞**A8**

Check color condition by input
-External Input
-Component
-RGB
-HDMI/DVI

☞**A12**

Check Test pattern

Screen normal? — Y → Check external device connection condition

Screen normal? — N → Replace module

Check external device connection condition → **Normal?** — Y → ☞ **A10/ A11** Check and replace Link Cable

Normal? — N → Request repair for external device

Check and replace Link Cable → **Screen normal?**

Screen normal? — Y → End

Screen normal? — N → ☞ **A28** Replace Main B/D (adjust VCOM)
For LGD panel

Replace Main B/D
For other panel

→ **Screen normal?**

Screen normal? — N → Replace Module

Screen normal? — Y → End

External device screen error-Color error

Check S/W Version → **Check version**

Check version — N → Check screen condition by input -External Input -Component -RGB -HDMI/DVI

Check version — Y → S/W Upgrade → **Normal screen?**

Normal screen? — N → (back to Check screen condition)

Normal screen? — Y → End

Check screen condition by input →
- **External Input error**
- **Component error**
- **RGB error**
- **HDMI/DVI**

External Input error / Component error → Connect other external device and cable (Check normal operation of External Input, Component, RGB and HDMI/DVI by connecting Jig, pattern Generator ,Set-top Box etc.) → **Screen normal?**

Screen normal? — N → Replace Main B/D

Screen normal? — Y → Request repair for external device

RGB error / HDMI/ DVI → Connect other external device and cable (Check normal operation of External Input, Component, RGB and HDMI/DVI by connecting Jig, pattern Generator ,Set-top Box etc.) → **Screen normal?**

Screen normal? — N → Replace Main B/D

Screen normal? — Y → Request repair for external device

6

Standard Repair Process					
LCD TV	**Error symptom**	**B. Power error**	**Established date**	**2010. 12 .14**	
		No power	**Revised date**		**7/14**

☞**A17**

Check Power LED

. Stand-By: Red
. Operating: white

Power LED On? — Y → DC Power on by pressing Power Key On Remote control → Normal operation? — N → ☞**A19** **Check Power On '"High"** → OK? — Y → Replace Power B/D

Power LED On? — N → Check Power cord was inserted properly → Normal? — N → **Check ST-BY 3.5V** ☞**A18**

Normal? — Y → **Close**

OK? — N → Replace Main B/D

Normal operation? — Y → ☞**A4** **Measure voltage of each output of Power B/D** → Normal voltage? — Y → Replace Main B/D

Normal voltage? — N → Replace Power B/D

Check ST-BY 3.5V → Normal voltage? — Y → DC Power on by pressing Power Key On Remote control

Normal voltage? — N → Replace Power B/D

7

LCD TV	**Error symptom**	**B. Power error**		**Established date**	**2010. 12 .14**	
		Off when on, off while viewing, power auto on/off		**Revised date**		**8/14**

Check outlet

Check A/C cord

Check for all 3- phase power out

Error? — N →

Y ↓

Fix A/C cord & Outlet and check each 3 phase out

☞**A22**

Check Power Off Mode

CPU Abnormal

Abnormal 1

Replace Main B/D — Normal? — Y → End

N ↓

Replace Power B/D

☞**A19**

(If Power Off mode is not displayed) Check Power B/D voltage

Normal voltage? — Y → Replace Main B/D

N ↓

Replace Power B/D

※ Caution
Check and fix exterior of Power B/D Part

* **Please refer to the all cases which can be displayed on power off mode.**

Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_RESREC"	Power off by Reservated Record
	"POWEROFF_RECEND"	Power off by End of Recording
	"POWEROFF_SWDOWN"	Power off by S/W Download
	"POWEROFF_UNKNOWN"	Power off by unknown status except listed case
Abnormal	**"POWEROFF_ABNORMAL1"**	Power off by abnormal status except CPU trouble
	"POWEROFF_CPUABNORMAL"	Power off by CPU Abnormal

8

LCD TV	Error symptom	C. Audio error		Established date	2010. 12 .14	
		No audio/ Normal video		Revised date		9/14

☞**A24**

No audio
Screen normal

Check user menu > Speaker off
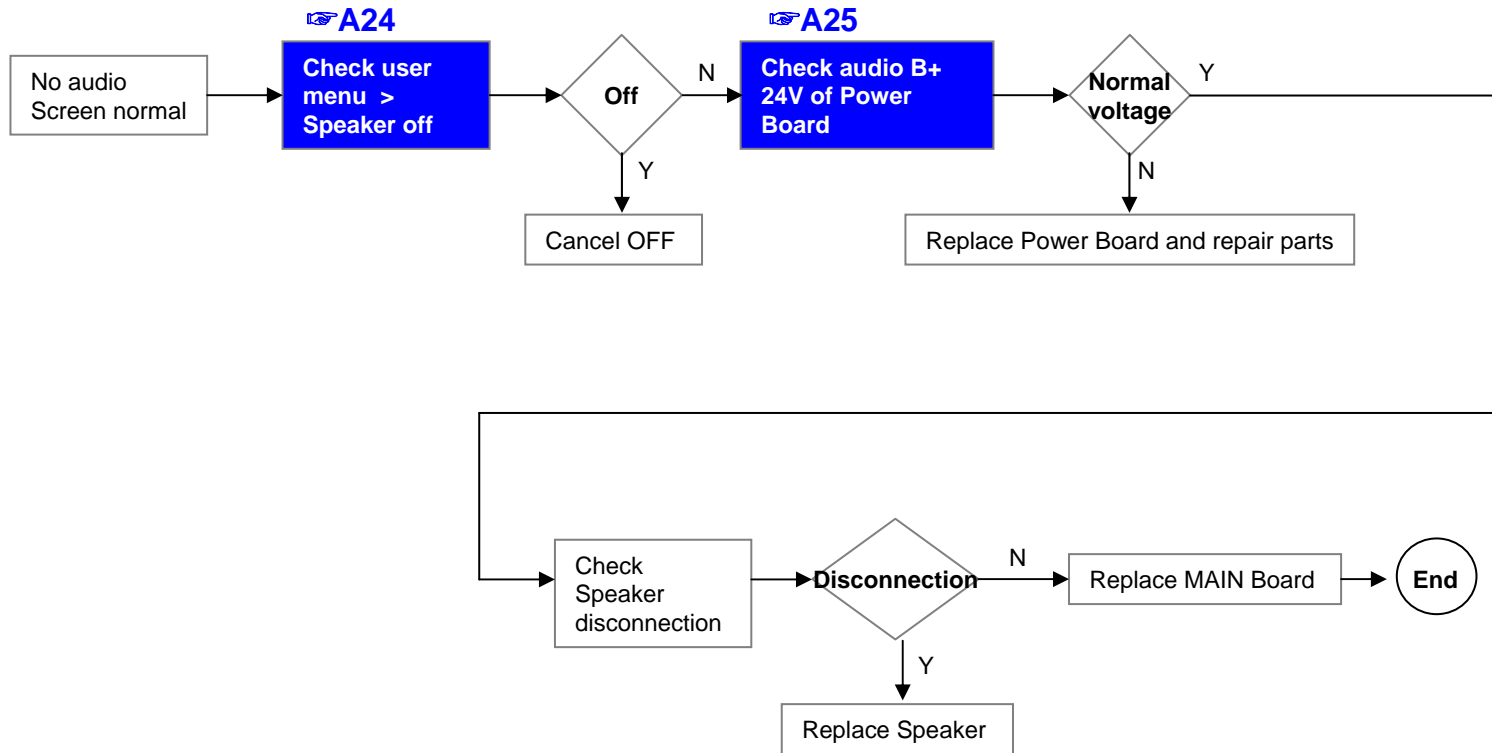
Off

N

☞**A25**

Check audio B+ 24V of Power Board

Normal voltage

Y

Y

Cancel OFF

N

Replace Power Board and repair parts

Check Speaker disconnection

Disconnection

N

Replace MAIN Board

End

Y

Replace Speaker

9

Standard Repair Process					
LCD TV	**Error symptom**	**C. Audio error**	**Established date**	**2010. 12 .14**	
		Wrecked audio/ discontinuation/noise	**Revised date**		**10/14**

→ abnormal audio/discontinuation/noise is same after "Check input signal" compared to No audio

Check input signal
-RF
-External Input signal

Signal normal?

Y

N

(When RF signal is not received)
Request repair to external cable/ANT provider

(In case of External Input signal error)
Check and fix external device

Wrecked audio/ Discontinuation/ Noise for all audio

Check and replace speaker and connector

☞**A25**

Check audio B+ Voltage (24V)

Y

Normal voltage?

N

Wrecked audio/ Discontinuation/ Noise only for D-TV

Replace Main B/D

Wrecked audio/ Discontinuation/ Noise only for Analog

Replace Power B/D

Wrecked audio/ Discontinuation/ Noise only for External Input

Connect and check other external device

Normal audio?

N

Y

Replace Main B/D

Check and fix external device

End

10

LCD TV	Error symptom	D. General Function Problem		Established date	2010. 12 .14	
		Remote control & Local switch checking		Revised date		11/14

1. Remote control(R/C) operating error

☞**A27**

☞**A27**

☞**A27**

Replace Main B/D

Check R/C itself Operation → **Normal operating?** —Y→ **Check & Repair Cable connection Connector solder** → **Normal operating?** —N→ **Check B+ 3.5V On Main B/D** → **Normal Voltage?** —Y→ **Check IR Output signal** → **Normal Signal?** —Y→ **Replace Main B/D**

Normal operating? —N

Normal operating? —Y→ **Close**

Normal Voltage? —N

Normal Signal? —N→ **Repair/Replace IR B/D**

Check R/C Operating When turn off light in room

Check & Replace Baterry of R/C

If R/C operate, Explain the customer cause is interference from light in room.

Normal operating? → **Close**

Normal operating? —N→ **Replace R/C**

☞**A4**

Check 3.5v on Power B/D Replace Power B/D or Replace Main B/D (Power B/D don't have problem)

11

LCD TV	Error symptom	D. Function error		Established date	2010. 12 .14	
		External device recognition error		Revised date		12/14

```
┌──────────┐      ◇              ┌──────────────────┐      ◇                ◇                    ┌──────────────────┐
│ Check    │     Signal    Y    │ Check technical  │    Technical    N   External Input and      │ Replace Main B/D │
│ input    │ →  ◇ input? ◇  →   │ information      │ → ◇ information?◇ →  ◇  Component      ◇  →  │                  │
│ signal   │     ◇              │ - Fix information│      ◇            Recognition error         └──────────────────┘
└──────────┘      │             │ - S/W Version    │      │
                  N             └──────────────────┘      Y
                  ↓                                       ↓
       ┌──────────────────┐                         ( Fix in         )
       │ Check and fix    │                         ( accordance     )      ◇ RGB,HDMI/        ◇   ┌──────────────────┐
       │ external device/ │                         ( with technical )   → ◇ DVI, Optical     ◇ → │ Replace Main B/D │
       │ cable            │                         ( information    )      ◇ Recognition error    └──────────────────┘
       └──────────────────┘
```

12

LCD TV	Error symptom	E. Noise	Established date	2010. 12 .14	
		Circuit noise, mechanical noise	Revised date		13/14

Identify nose type

Circuit noise

Check location of noise

OR

Replace PSU (with LED driver)

Replace LED driver

Mechanical noise

Check location of noise

※ Mechanical noise is a natural phenomenon, and apply the 1st level description. When the customer does not agree, apply the process by stage.
※ Describe the basis of the description in "Part related to nose" in the Owner's Manual.

OR

※ When the nose is severe, replace the module (For models with fix information, upgrade the S/W or provide the description)

※ If there is a "Tak Tak" noise from the cabinet, refer to the KMS fix information and then proceed as shown in the solution manual (For models without any fix information, provide the description)

13

LCD TV	Error symptom	F. Exterior defect	Established date	2010. 12 .14	
		Exterior defect	Revised date		14/14

Zoom part with exterior damage

Module damage → Replace module → **Adjust VCOM** ☞**A28**

Cabinet damage → Replace cabinet

Remote controller damage → Replace remote controller

Stand dent → Replace stand

14

Contents of LCD TV Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
1	A. Video error_ No video/Normal audio	Check LCD back light with naked eye	A1	
2		LED driver B+ 24V measuring method	A2	
3		Check White Balance value	A3	
4		Power Board voltage measuring method	A4	
6	A. Video error_ No video/Video lag/stop	TUNER input signal strength checking method	A6	
7		LCD-TV Version checking method	A7	
9	A. Video error_Color error	LCD TV connection diagram	A8	
10		Tuner Checking Part	A9	
11		Check Link Cable (LVDS) reconnection condition	A10 A11	
12		Adjustment Test pattern - ADJ Key	A12	
13	A. Video error_Vertical/Horizontal bar, residual image, light spot	LCD TV connection diagram	A8	
14		Check Link Cable (LVDS) reconnection condition	A10 A11	A10 : LVDS A11 : Driver b'd
15		Adjustment Test pattern - ADJ Key	A12	
16	<Appendix> Defected Type caused by T-Con/ Inverter/ Module	Exchange T-Con Board (1)	A-1/5	
17		Exchange T-Con Board (2)	A-2/5	
18		Exchange LED driver Board (PSU)	A-3/5	
19		Exchange Module itself (1)	A-4/5	
20		Exchange Module itself (2)	A-5/5	

Continue to the next page

Contents of LCD TV Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
21	B. Power error_No power	Check front display LED	A17	
22		Check power input Voltage & ST-BY 5V	A18	
23		Checking method when power is ON	A19	
24		POWER BOARD voltage measuring method	A4	
25				
26	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A22	
27	B. Power error_Off when on, off while viewing	POWER BOARD PIN voltage checking method	A19	
28	C. Audio error_No audio/Normal video	Checking method in menu when there is no audio	A24	
29		Voltage and speaker checking method when there is no audio	A25	
30	C. Audio error_Wrecked audio/discontinuation	Voltage and speaker checking method in case of audio error	A25	
31	D. Function error_ No response in remote controller, key error	Remote controller operation checking method	A27	
32	D. VCOM Adjustment	Sequence of the Vcom adjustment	A28	

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2010. 12 .14	
	Content	Check LCD back light with naked eye	Revised date		A1

<XXLW950/XXLW980X MODELS>

<XXLW770X MODELS>
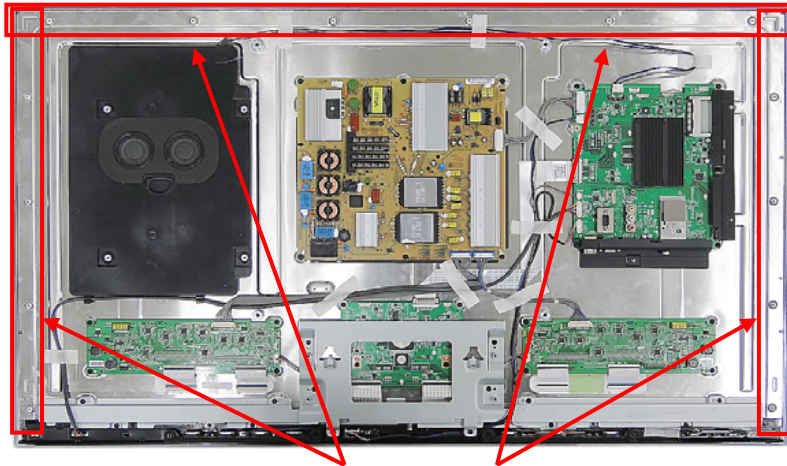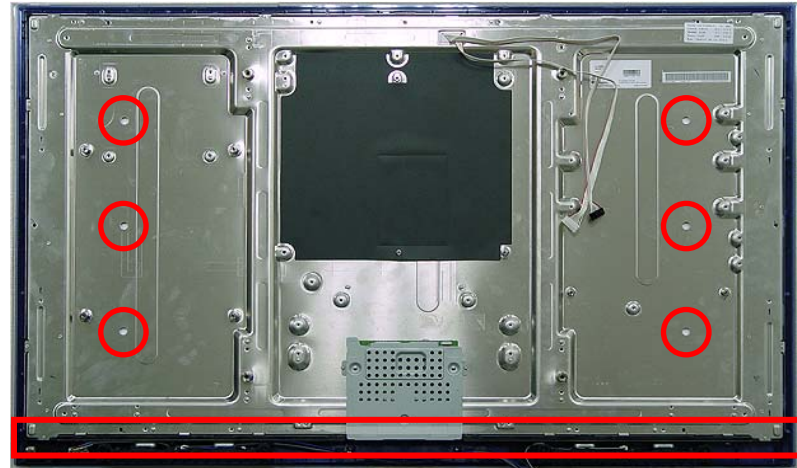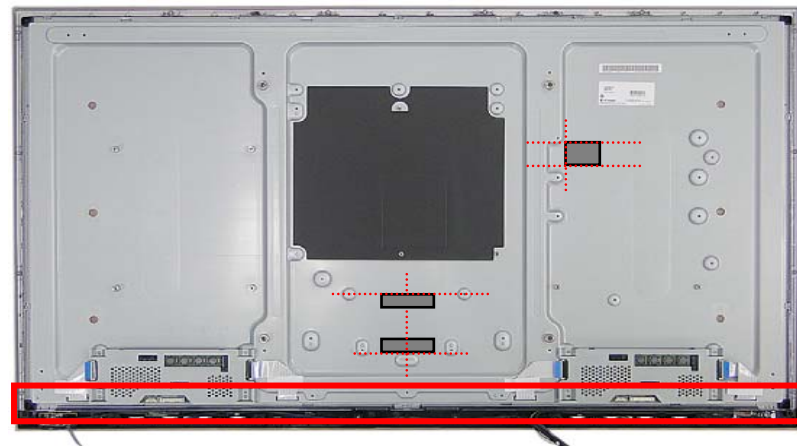
After turning on the power and disassembling the case, check with the naked eye, whether you can see light from module

A1

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2010. 12 .14	
	Content	LED driver B+ 24V measuring method	Revised date		A2

Check the DC 24V, 12V, 3.5V and Inverter on

ALEF LED

Edge LED
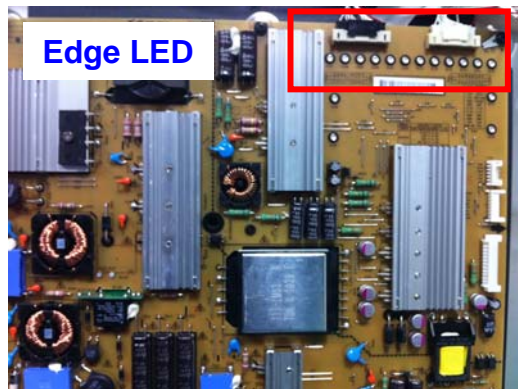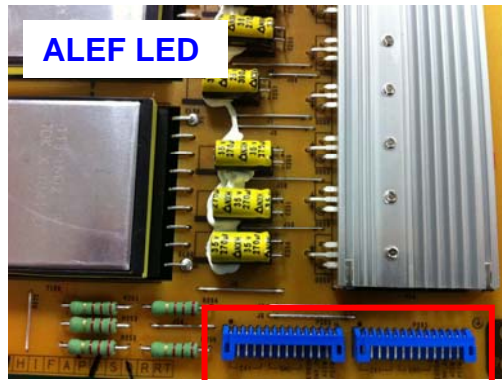
P202	
1~5	24V
6~10	GND
11	Error
12	Inverter ON
13	A-dim
14	P-dim

P203	
1~5	24V
6~10	GND
11	Error
12	Inverter ON
13	A-dim
14	P-dim

A2

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2010. 12 .14	
	Content	Check White Balance value	Revised date		A3

<ALL MODELS>
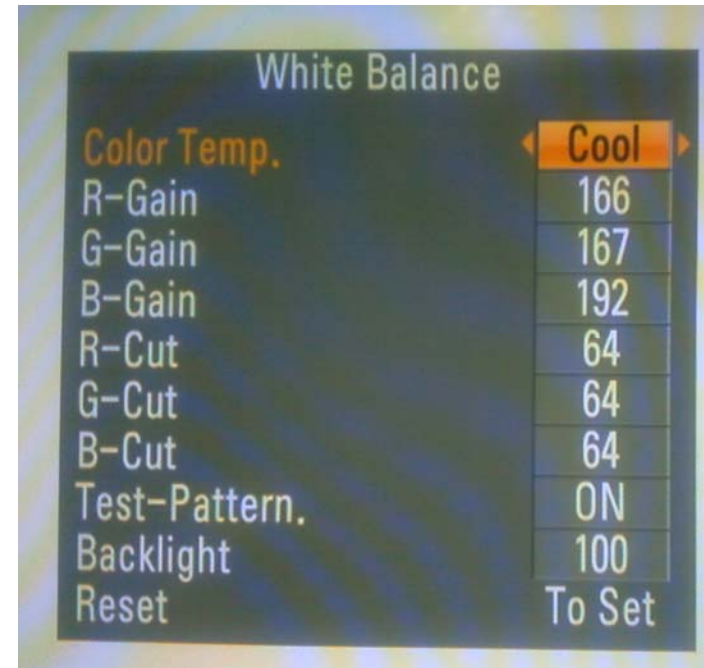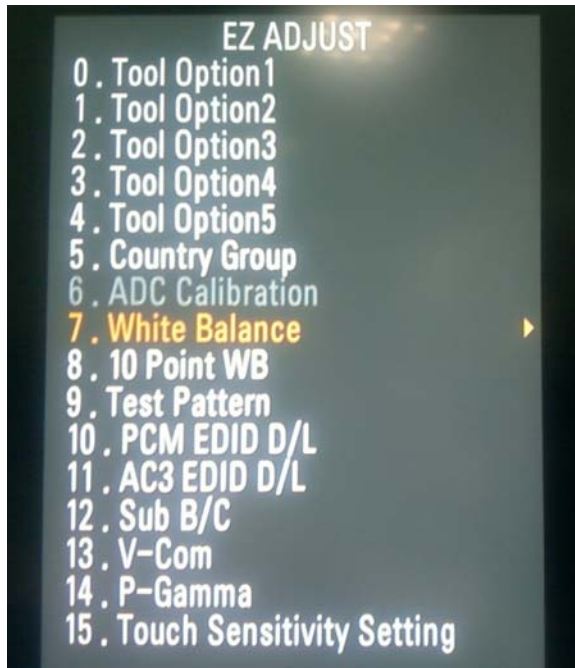
Entry method

1. Press the ADJ button on the remote controller for adjustment.

2. Enter into White Balance of item 7.

3. After recording the R, G, B (GAIN, Cut) value of Color Temp
   (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

A3

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/ Audio	Established date	2010. 12 .14	
	Content	Power Board voltage measuring method	Revised date		A4

ALEF LED

Edge LED
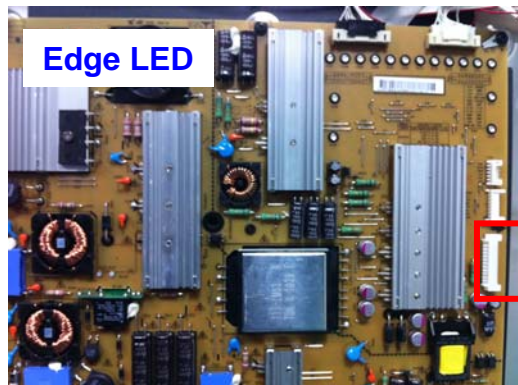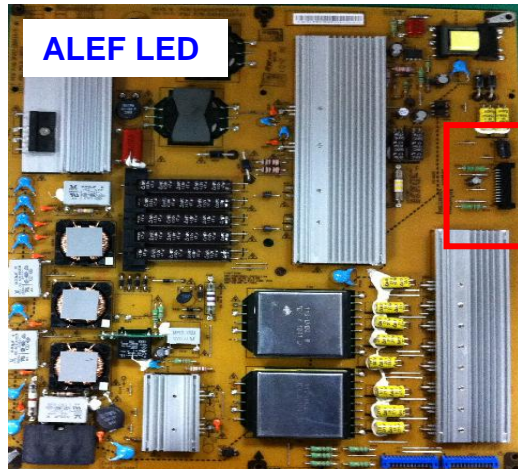
Check the DC 24V, 12V, 3.5V.

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

A4

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2010. 12 .14	
	Content	TUNER input signal strength checking method	Revised date		A6

<ALL MODELS>

MENU -→ Set up → support -→ signal test -→ select channel
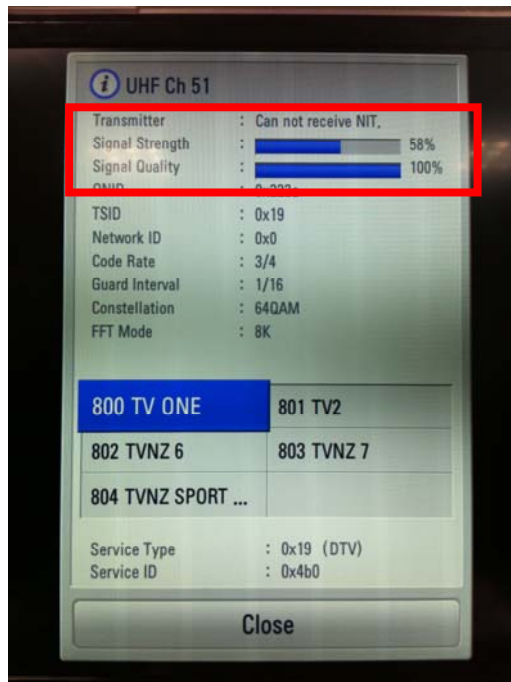
When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)

A6

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2010. 12 .14	
	Content	LCD-TV Version checking method	Revised date		A7

<ALL MODELS>

1. Checking method for remote controller for adjustment

Version
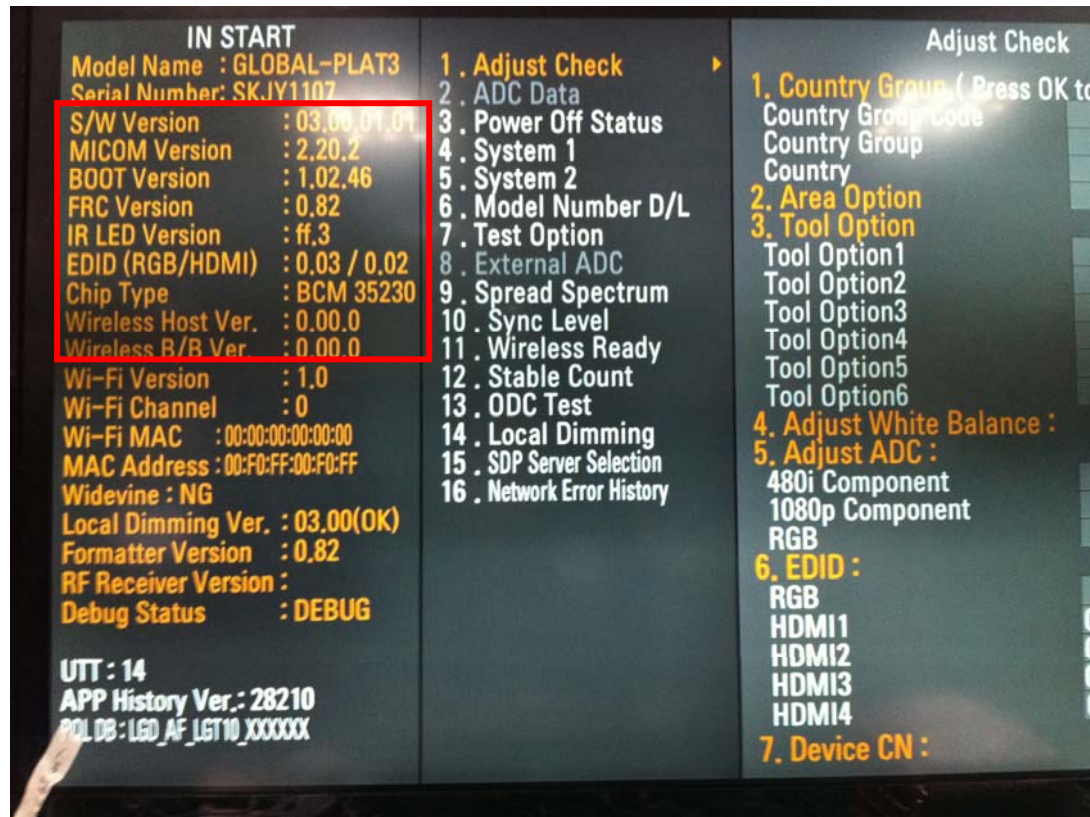
Press the IN-START with the remote controller for adjustment

A7

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date	2010. 12 .14	
	Content	LCD TV connection diagram (1)	Revised date		A8

<ALL MODELS>

(Except for 32/37/42/47LV550S,
32/37/42/47LV550G,
32/37/42/47/55LW550S,
32/37/42/47/55LW550G,
32/42/47/55LW650S,
32/42/47/55LW650G,
42/47/55LW750S,
42/47/55LW750G)

(Only 32/37/42/47LV550S, 32/37/42/47LV550G, 32/37/42/47/55LW550S,
32/37/42/47/55LW550G, 32/42/47/55LW650S, 32/42/47/55LW650G,
42/47/55LW750S, 42/47/55LW750G)
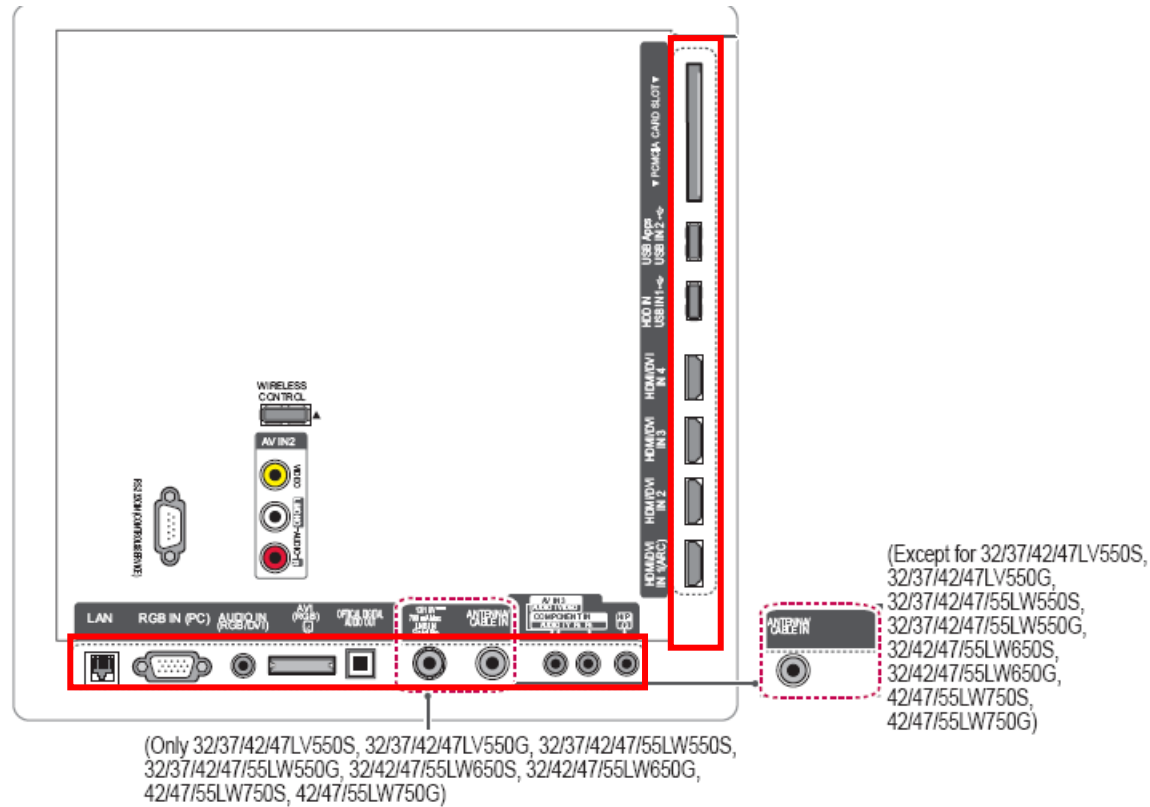
As the part connecting to the external input, check the screen condition by signal

A8

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2010. 12 .14	
	Content	TUNER checking part	Revised date		A9

<ALL MODELS>
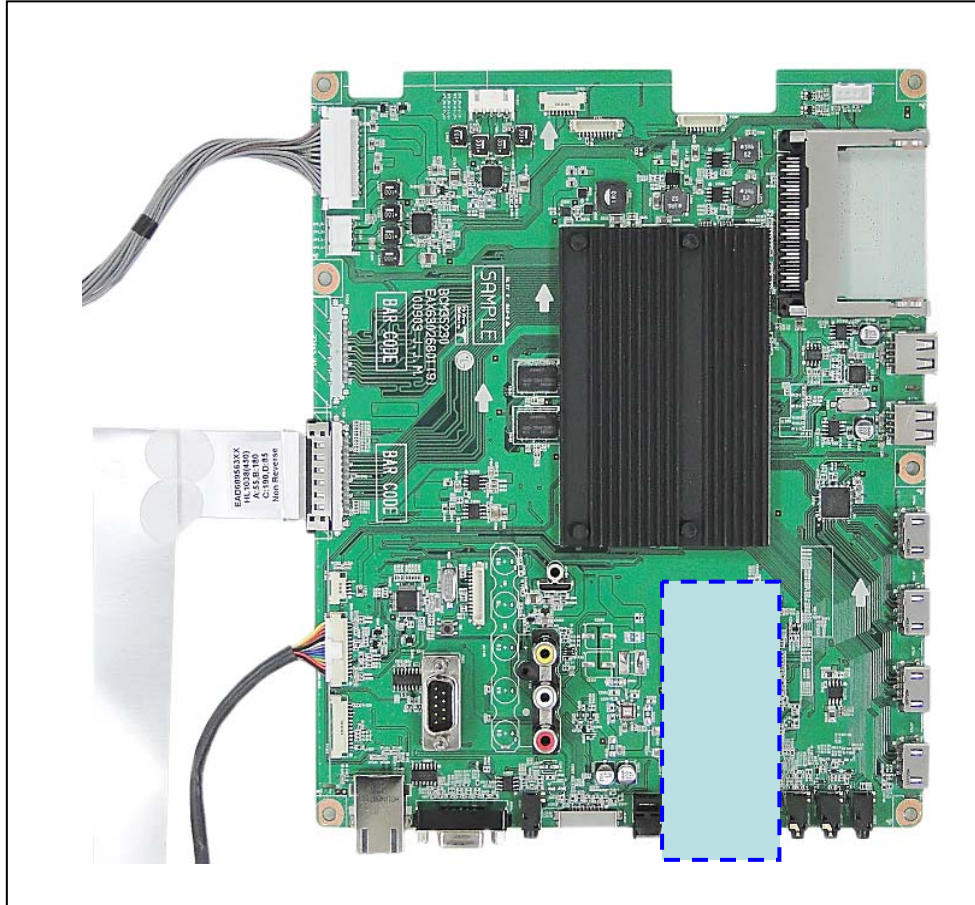
Checking method:
1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.

A9

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2010. 12 .14	
	Content	Check Link Cable (LVDS) reconnection condition	Revised date		A10

<ALL MODELS>
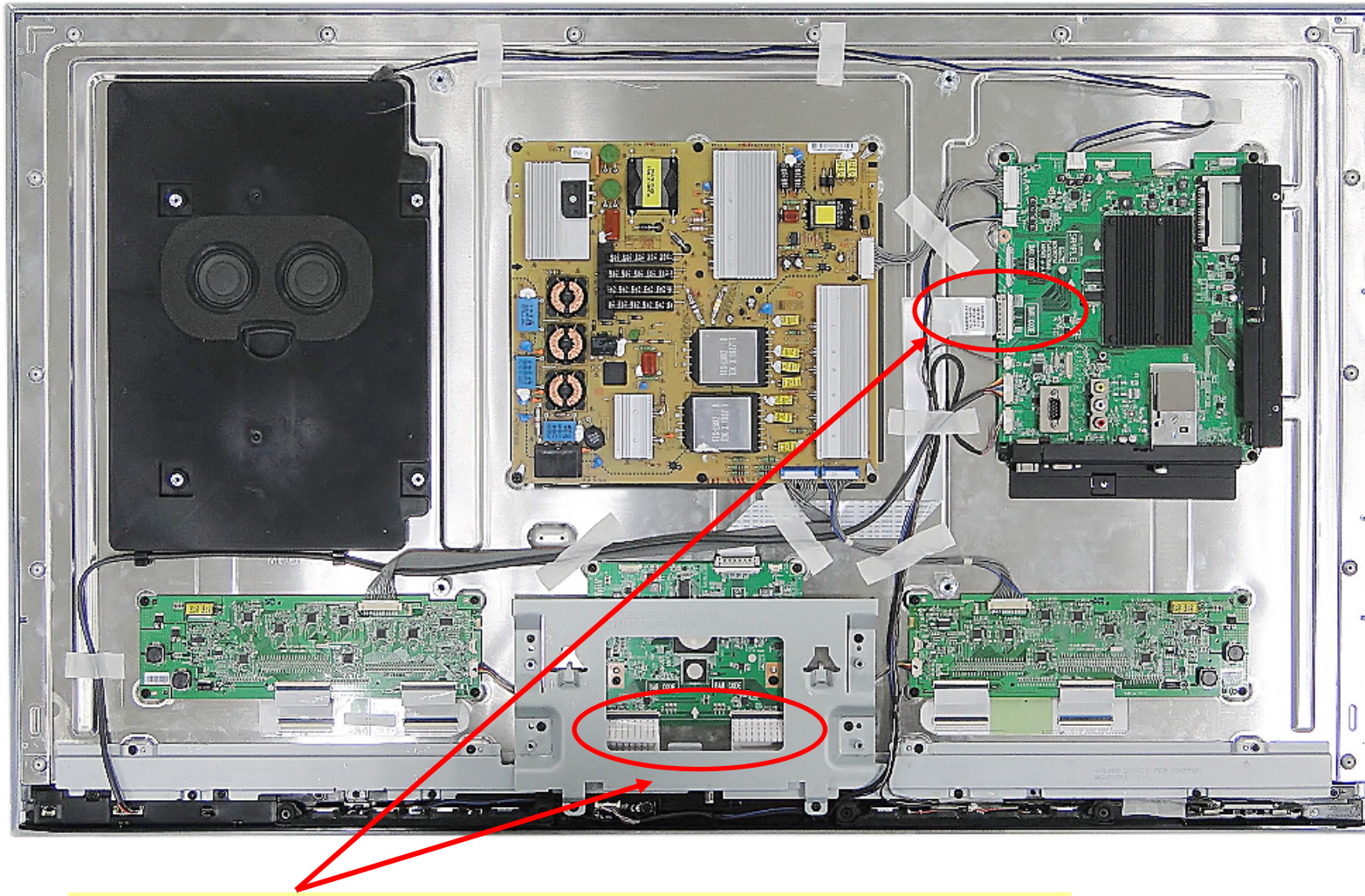
Check the contact condition of the Link Cable, especially dust or mis insertion.

A10

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2010. 12 .14	
	Content	Check Link Cable reconnection condition	Revised date		A11

<ALL MODELS>
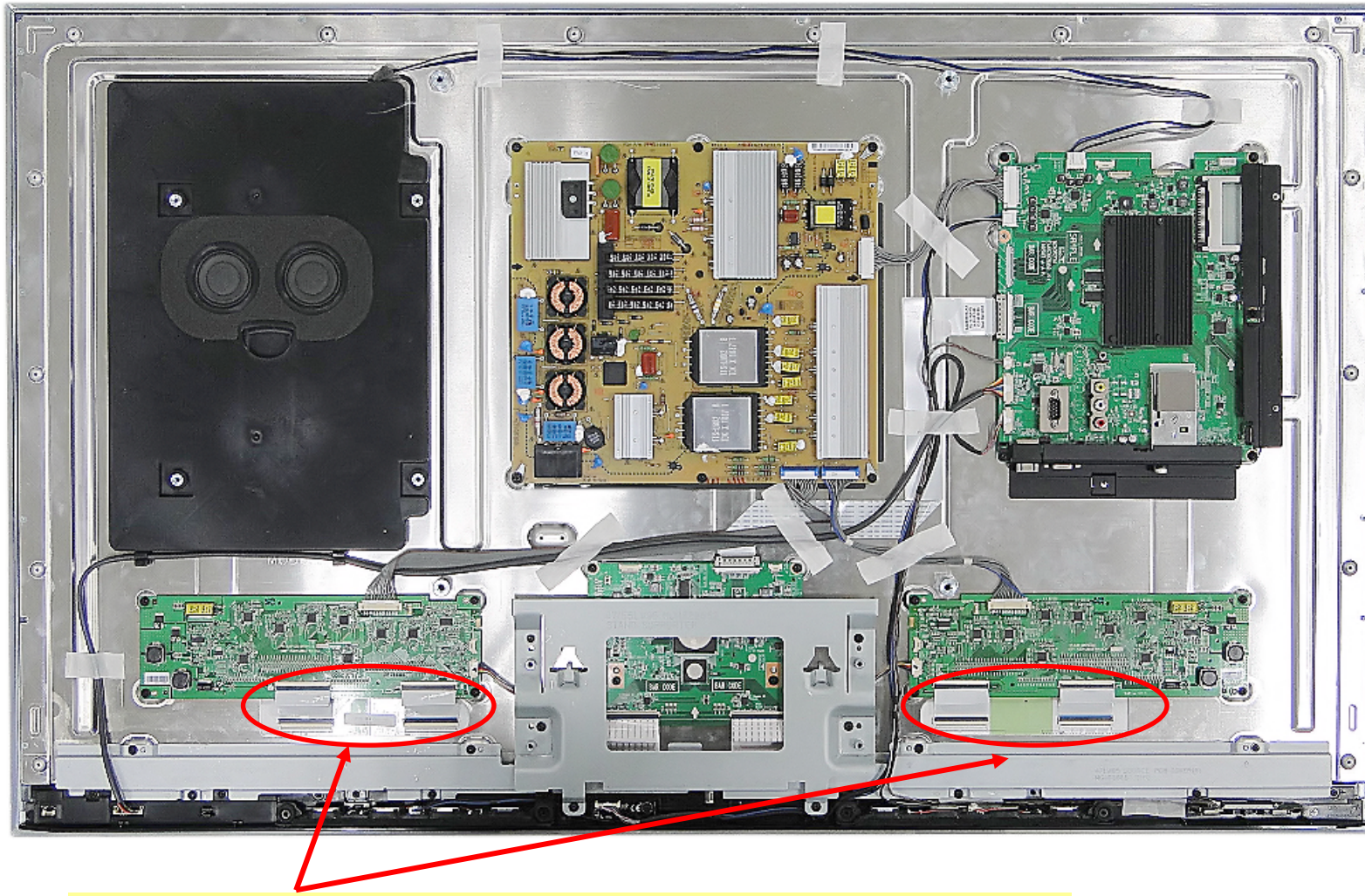
Check the contact condition of the Link Cable, especially dust or mis insertion.

A11

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2010. 12 .14	
	Content	Adjustment Test pattern - ADJ Key	Revised date		A12

EZ ADJUST
0 . Tool Option1
1 . Tool Option2
2 . Tool Option3
3 . Tool Option4
4 . Tool Option5
5 . Country Group
6 . ADC Calibration
7 . White Balance
8 . 10 Point WB
9 . Test Pattern ▶
10 . PCM EDID D/L
11 . AC3 EDID D/L
12 . Sub B/C
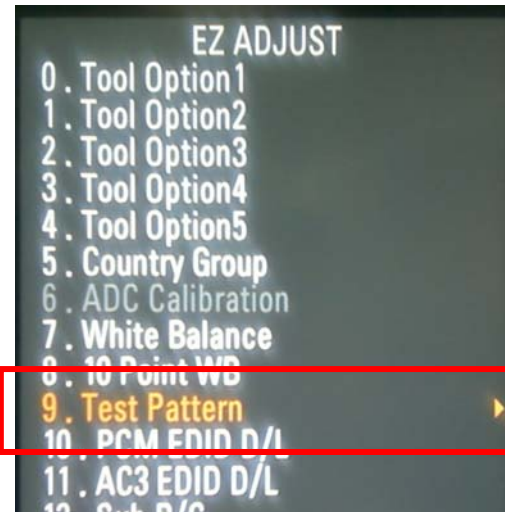
You can view 6 types of patterns using the ADJ Key

Checking item : 1. Defective pixel   2. Residual image   3. MODULE error (ADD-BAR,SCAN BAR..)
              4.Video error (Classification of MODULE or Main-B/D!)

A12

Appendix : Exchange T-Con Board (1)

Solder defect, CNT Broken
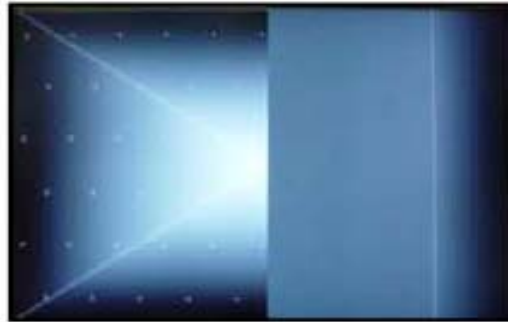
Solder defect, CNT Broken
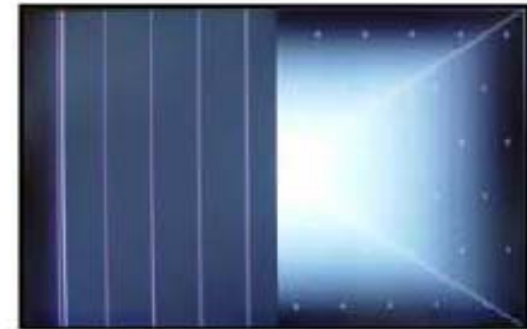
Solder defect, CNT Broken

Solder defect, CNT Broken
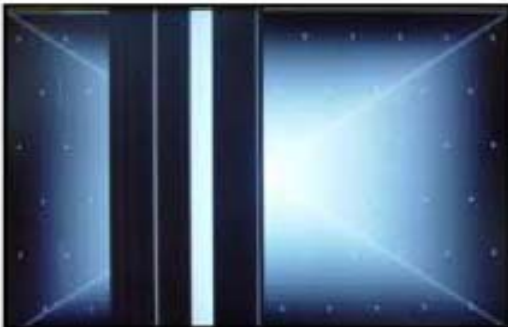
Solder defect, CNT Broken

Abnormal Power Section
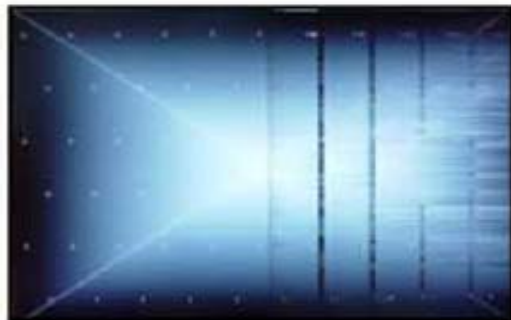
Solder defect, Short/Crack

Abnormal Power Section

Solder defect, Short/Crack

A - 1/5

Appendix : Exchange T-Con Board (2)
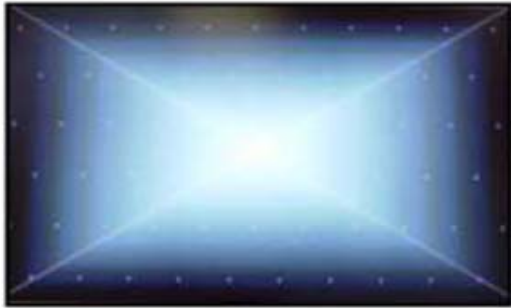
Abnormal Power Section

Abnormal Power Section

Solder defect, Short/Crack

Solder defect, Short/Crack

Fuse Open, Abnormal power section

Abnormal Display

GRADATION

Noise

GRADATION

A - 2/5
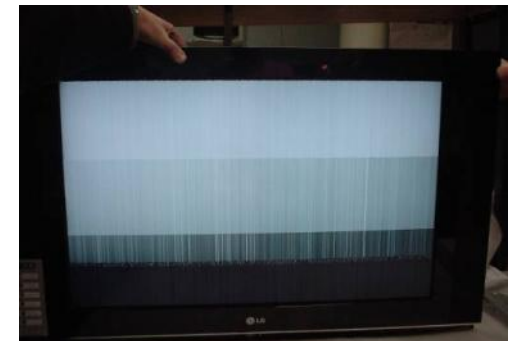
Appendix : Exchange PSU(LED driver)

No Light

Dim Light

Dim Light
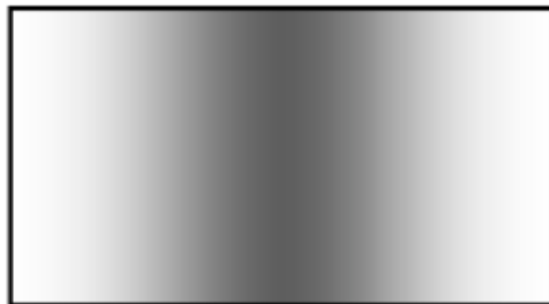
Dim Light

No picture/Sound Ok

A - 3/5

Appendix : Exchange the Module (1)

Panel Mura, Light leakage

Panel Mura, Light leakage

Press damage
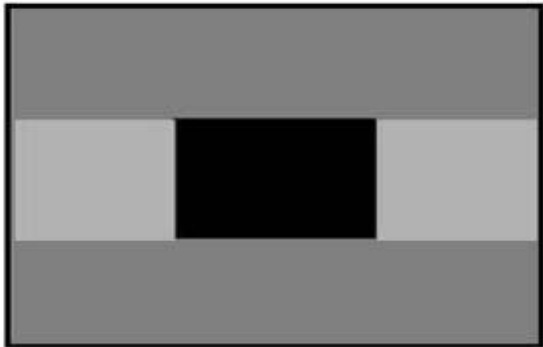
Crosstalk

Press damage

Crosstalk

Press damage

Un-repairable Cases

In this case please exchange the module.

A - 4/5

Appendix : Exchange the Module (2)
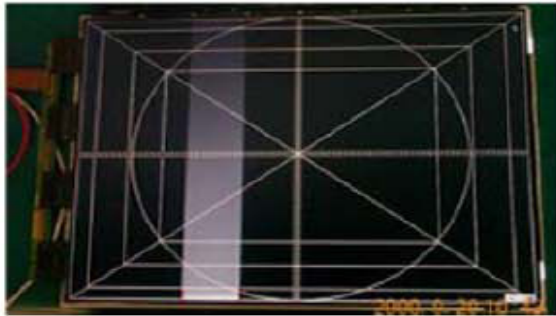
Vertical Block
Source TAB IC Defect

Vertical Line
Source TAB IC Defect

Vertical Block
Source TAB IC Defect

Horizontal Block
Gate TAB IC Defect

Horizontal Block
Gate TAB IC Defect

Horizontal line
Gate TAB IC Defect
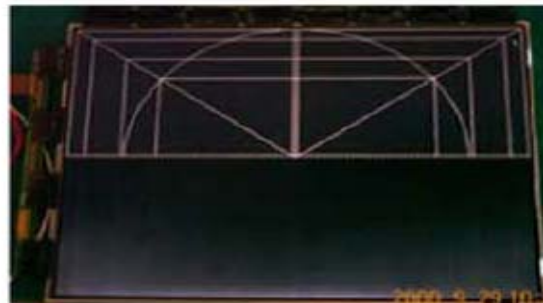
Horizontal Block
Gate TAB IC Defect

Un-repairable Cases
In this case please exchange the module.

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Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Check front display LED	Revised date		A17

Screen

Front LED control :
Menu → Option → Power Indicator
→ Standby light ON

Remote control and intelligent[1] sensors

Power indicator

Speakers

P   ⊿   OK◉ HOME INPUT ⏻/|
∨   ∧   −   +   ✓   H   �’   ⏻

Touch buttons[2]

ST-BY condition: Red
Power ON condition: white
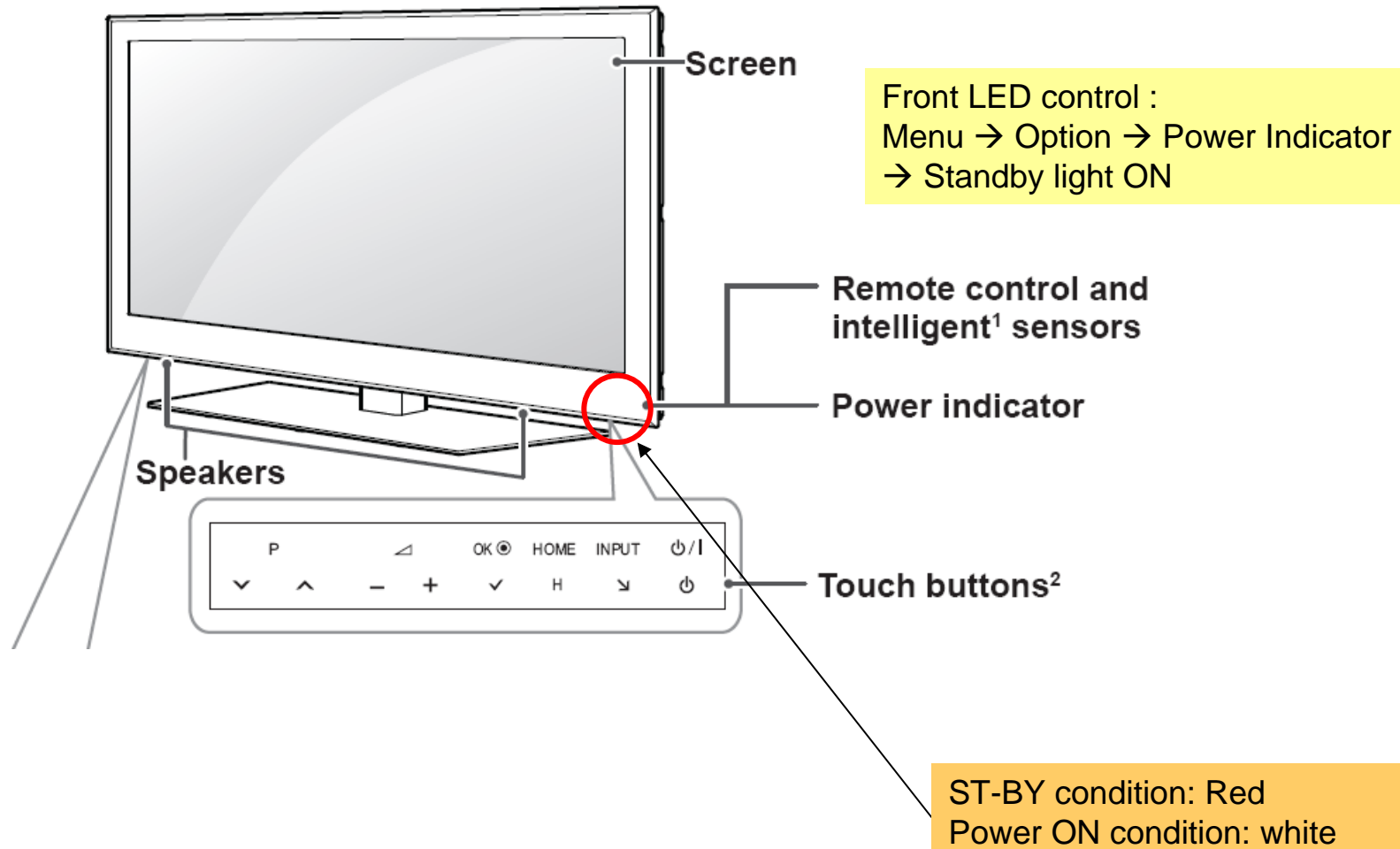
A17

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Check power input voltage and ST-BY 5V	Revised date		A18

For '10 models, there is no voltage out for st-by purpose.
When st-by, only 3.5V is normally on.

ALEF LED

Edge LED
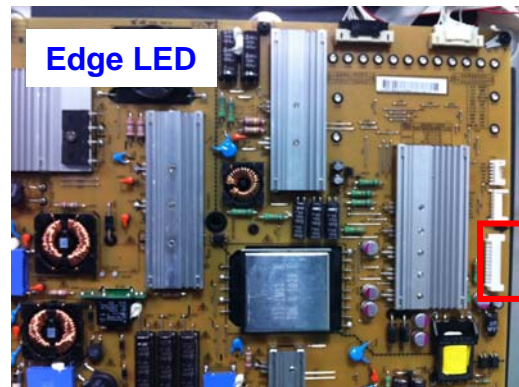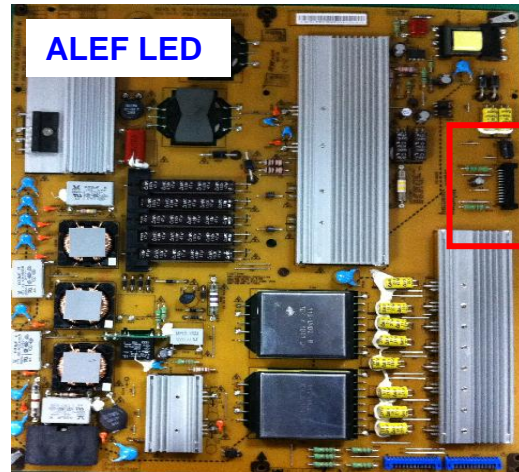
Check the DC 20V/24V, 12V, 3.5V.

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

A18

Standard Repair Process Detail Technical Manual

| LCD TV	Error symptom	B. Power error _No power	Established date	2010. 12 .14	
	Content	Checking method when power is ON	Revised date		A19

ALEF LED

Edge LED
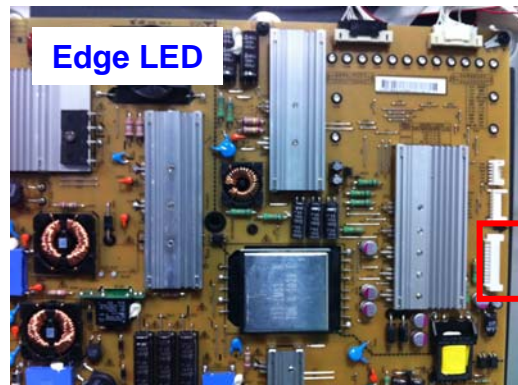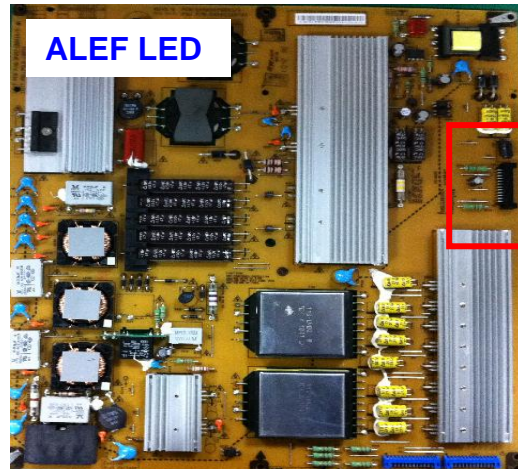
Check "power on" pin is high

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

A19

Standard Repair Process Detail Technical Manual

| LCD TV	Error symptom	B. Power error _Off when on, off whiling viewing	Established date	2010. 12 .14	
	Content	POWER OFF MODE checking method	Revised date		A22

<ALL MODELS>
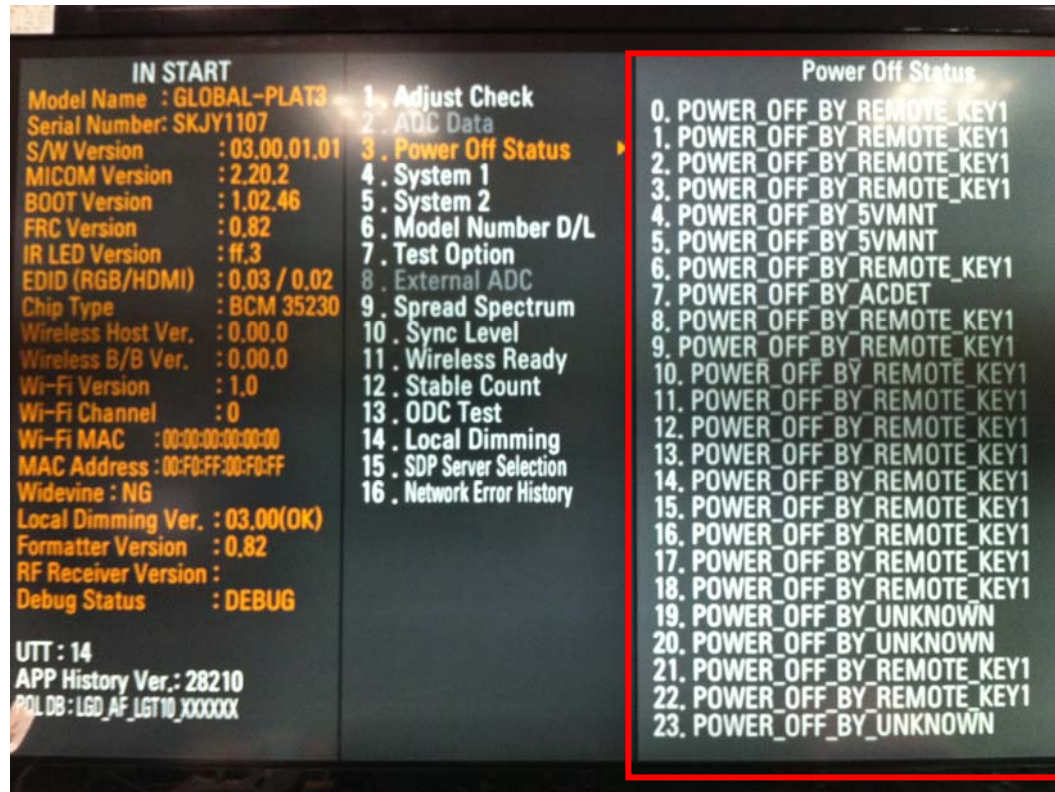
Entry method

1. Press the IN-START button of the remote controller for adjustment

2. Check the entry into adjustment item 3

A22

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2010. 12 .14	
	Content	Checking method in menu when there is no audio	Revised date		A24

<ALL MODELS>
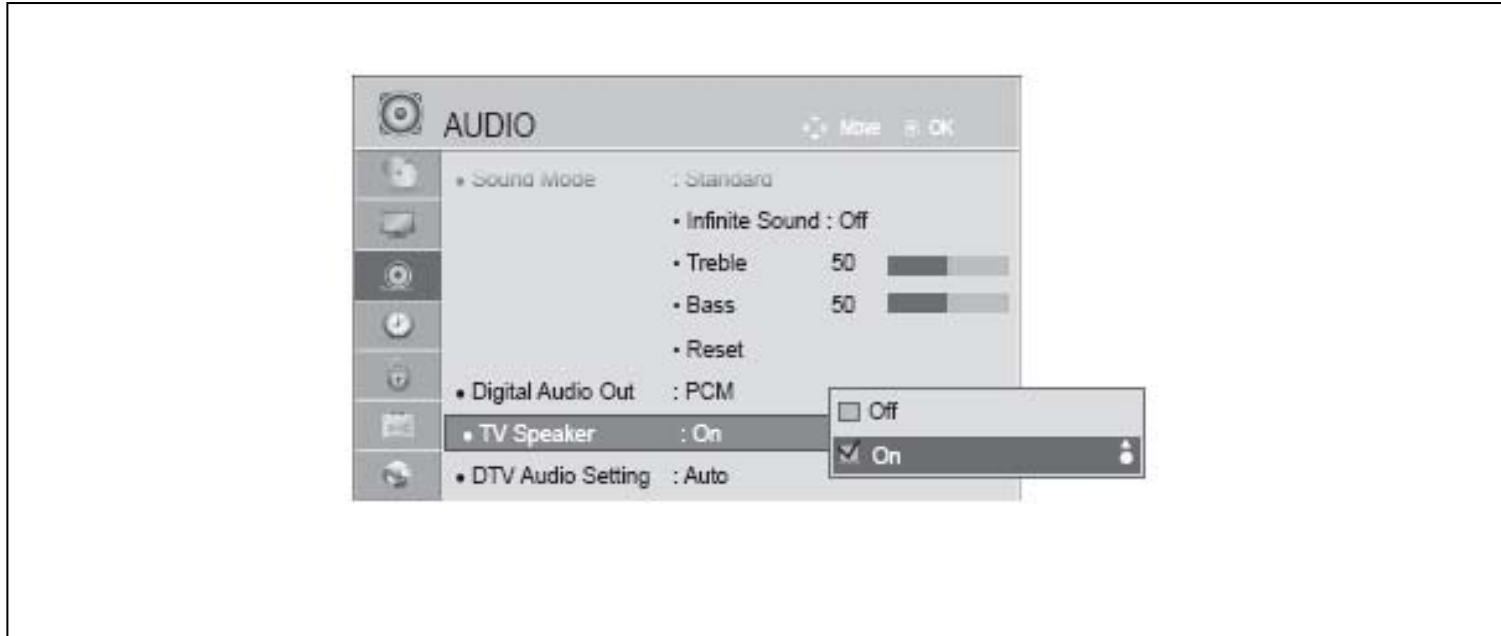
Checking method

1. Press the MENU button on the remote controller

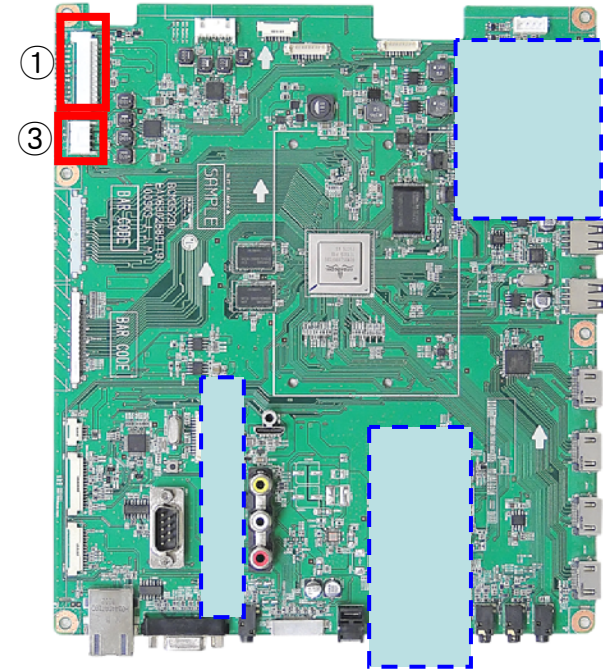2. Select the AUDIO function of the Menu

3. Select TV Speaker from Off to On

A24

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2010. 12 .14	
	Content	Voltage and speaker checking method when there is no audio	Revised date		A25

<ALL MODELS>

| 24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

① ③ ②

Checking order when there is no audio

① Check the contact condition of or 24V connector of Main Board

② Measure the 24V input voltage supplied from Power Board
   (If there is no input voltage, remove and check the connector)

③ Connect the tester RX1 to the speaker terminal and if you hear the Chik Chik sound when you touch the GND and output terminal, the speaker is normal.
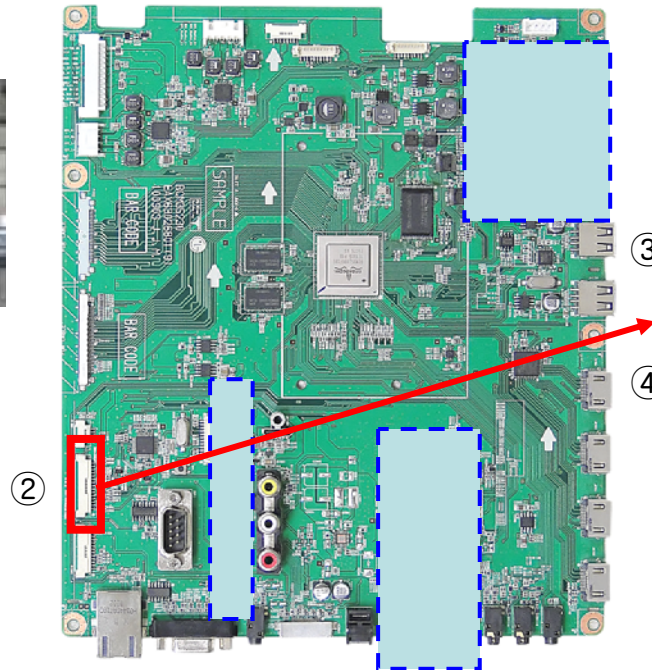
A25

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. Function error_ No response in remote controller, key error	Established date	2010. 12 .14	
	Content	Remote controller operation checking method	Revised date		A27

<ALL MODELS>
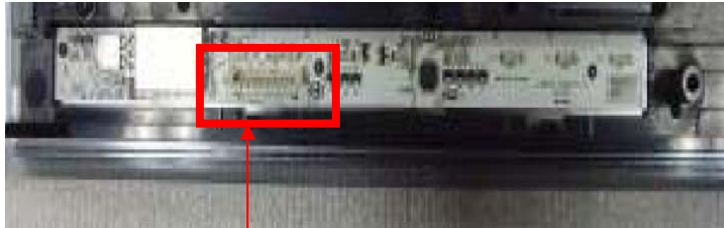
P8200	
1	SCL
2	SDA
3	GND
4	KEY1
5	KEY2
6	St 3.5V
7	GND
8	LED B/logo PWM
9	IR
10	GND
11	3.3V_Normal
12	LED_R/BUZZ
13	GND
14	ST_SCL
15	ST_SDA

Checking order

1, 2. Check IR cable condition between IR & Main board.
3.   Check the st-by 3.3V on the terminal 6.
4. When checking the Pre-Amp when the power is in ON condition, it is normal when the
      Analog Tester needle moves slowly, and defective when it does not move at all.

A27

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. VCOM Adjustment	Established date	2010. 12 .14	
	Content	Sequence of the Vcom adjustment	Revised date		A28

1. Case
■ LCD module change
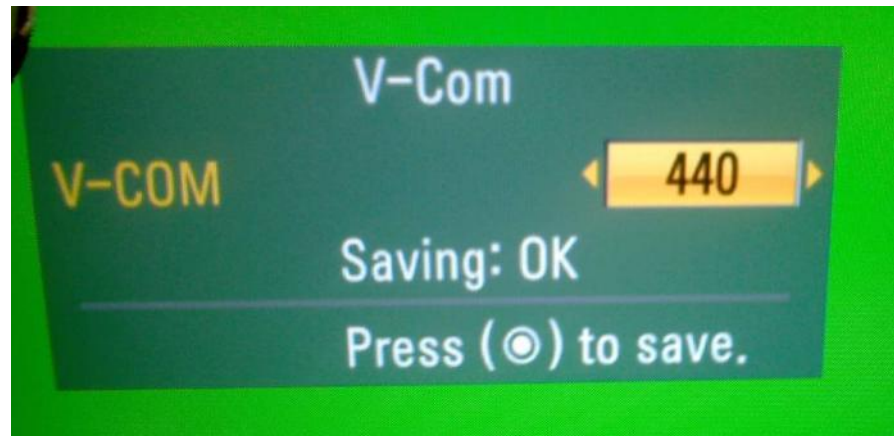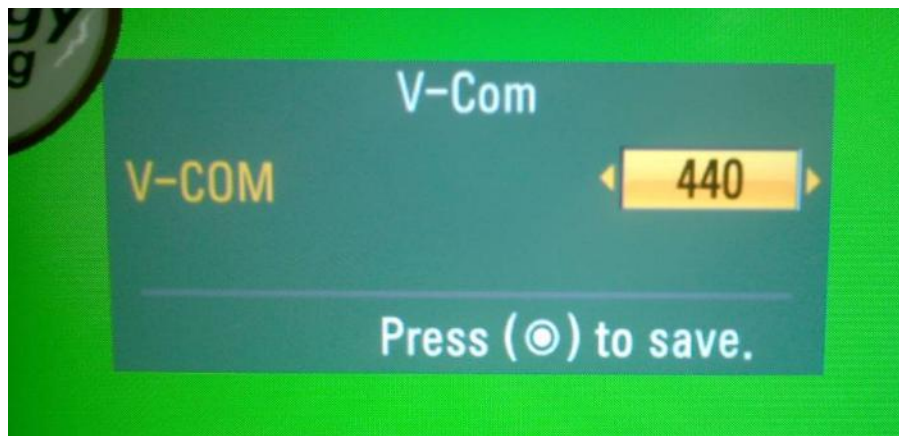■ T-Con board change

2. Equipment
■ Service Remote controller

3. Adjust sequence
■ Press the 'adj' key
■ select V-COM
■ As pushing the right or the left button on the remote controller, And find the V-COM value Which is no or minimized the Flicker.
(If there is no flicker at default value, Press the exit key and finish the VCOM adjustment.)
■ Push the OK key to store the value. Then the message "Saving OK" is pop.
■ Press the exit key to finish V-COM adjustment.

A28